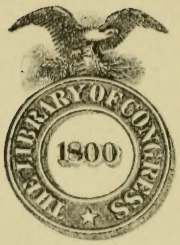

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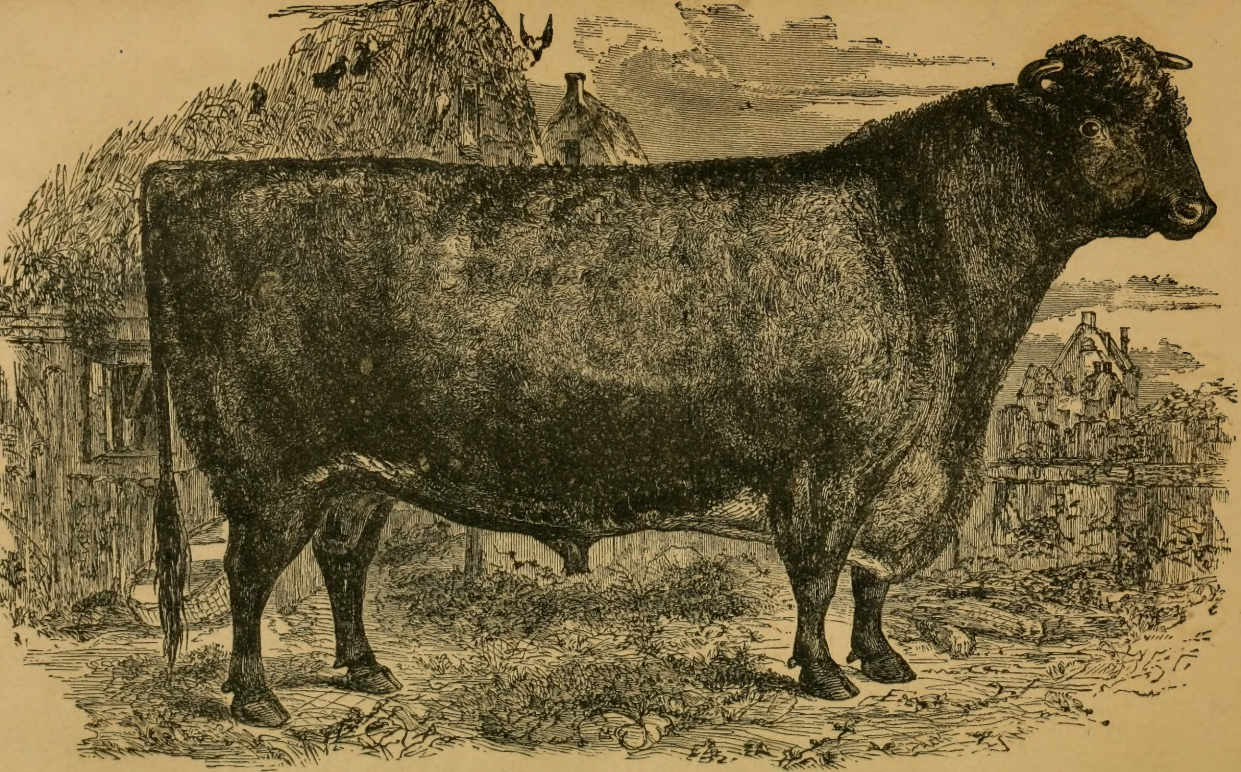

The celebrated Short-Horn Bull, Waterloo. 2816.

Bred by Mr. Stevenson, of Wolviston, County of Durham, England.

CATTLE.

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BY

W. YOUATT.

AND

W. C. L. MARTIN,

BEING A TREATISE ON THEIR

BREEDS, MANAGEMENT, AND DISEASES,

COMPRISING A

FULL HISTORY OF THE VARIOUS RACES;

THEIR ORIGIN, BREEDING, AND MERITS; THEIR CAPACITY FOR BEEF AND MILK; THE NATURE AND TREATMENT OF THEIR DISEASES;

THE WHOLE FORMING A COMPLETE GUIDE

FOR THE

FARMER, THE AMATEUR, AND VETERINARY SURGEON,

WITH 100 ILLUSTRATIONS.

EDITED BY A. STEVENS.

NEW-YORK:

C. M. SAXTON, AGRICULTURAL BOOK PUBLISHER,

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PREFACE TO THE AMERICAN EDITION.

In presenting an edition of Youatt to the American public, the American editor may justly say, that, of all the treatises on cattle, none is so valuable as his. Mr. Youatt was a man of rare ability; a scholar, distinguished for the extent, variety, and elegance of his attainments; for his power of research, historical, and scientific; for the brilliancy of his style; and as a veterinary surgeon of profound knowledge, in both the science and practice of his art, and of devotion to its pursuit. Scarcely any man of all the world was so happily fitted as he, to produce a great historical and medical work on cattle.

And while he was so peculiarly qualified to write such a work, the circumstances that originated it were eminently the ones to insure him success in the undertaking. An association existed in England, under the name of The Society for the diffusion of useful Knowledge. Men of eminence in every variety of learning were its members; the publication of practical treatises in all departments of useful knowledge, its object. Appreciating the ability of Mr. Youatt to give the world a valuable work on the history, breeds, management, and diseases of cattle, this Society enlisted him in its production.

In preparing this treatise for publication, the American editor has abridged it of the history of local and inferior breeds of cattle in England, in which the American farmer and amateur has no interest. There is not a page in the whole, but has been carefully considered, and, where it required, its matter advanced to the present state of

knowledge on the subject. In doing this, many works on the subject, published since Mr. Youatt's, have been examined. The chief of these is, The Ox, by Mr. W. C. L. Martin, one of the officers of the London Zoological Society.

The editor has consulted three recent German treatises on the diseases of cattle. The most valuable of these is by Gunther, who has applied homœopathy to animals. In addition to the ordinary modes of practice, the editor has given the treatment of Gunther. It is within his knowledge, that the prescriptions of homœopathy have been eminently successful in the diseases of both horses and cattle. This method of managing their diseases will be valuable to those who adopt the school of Hahnemann, while it detracts nothing from the work as a manual of ordinary veterinary practice.

Thousands of copies of Youatt and Martin are annually sold in England, and, there, opinion has established them as standards in their branch of knowledge. This American edition commends itself by its small price, and its intrinsic value, and should sell in thousands.

Great credit is due to the American publisher, for giving to the public this edition, beautiful alike for its embellishment and its typography.

CONTENTS.

Page

PREFACE 3

CHAPTER I. —THE NATURAL HISTORY OF THE OX.—His Zoological character—domesticated before the Flood 9

CHAPTER II.—THE BRITISH OX.—No satisfactory description of cattle by early writers—in the feudal times—occasional wild cattle—those of Chillingham Park—Present cattle classed according to the size of their horns—the middle-horns probably the original breed—they are found where the natives retreated from their invaders—essentially the same wherever found 11

CHAPTER III.—THE MIDDLE-HORNS.—The DEVONS—The proper form and shape of cattle—the Devons tried by this test—the Devon bull—the Devon cow—the working properties of the Devon ox—his disposition to fatten—value of the cow for the dairy—attempted crosses—the vale of Exeter—South Devon cattle—SOMERSETSHIRE cattle—pure Devons on the borders of Devon—gradual change of character—the present cattle—The HEREFORDS—description of them—comparison between them and the Devons—fattening properties—SUSSEX cattle—description—comparison with Devons and Herefords—Sussex cow—West Sussex cattle—WALES—general character of the Welsh cattle—PEMBROKES—GLAMORGANS—former character of them—present breed—late improvement—ANGLESEY cattle—SCOTLAND—the WEST HIGHLAND cattle—the HEBRIDES—Description of the true Kyloe—Hebridean management—The outer Hebrides—the tacksman—ARGYLESHIRE—the cattle—rearing—Cantire—the SHETLANDERS—description—management—ABERDEEN—description of the cattle—the Kintore ox—AYRSHIRE—present state—cattle—opinions of their origin—their value as dairy-cows—produce—profit—fattening properties of the Ayrshires—management 15

CHAPTER IV.—POLLED CATTLE.—GALLOWAYS—Description of the Galloways—general excellence of the Galloways—comparisons between the feeding qualities of Devons and Scots—ANGUS—the polled cattle—comparison between them and the Galloways—NORFOLK—the original breed horned—source of the present breed—SUFFOLK—description—extraordinary instances of produce . . 63

CHAPTER V.—THE IRISH CATTLE.—The aboriginal breed middle-horns—the Kerry Cow—the prevailing breed were probably the Cravens—Improvement slower in Ireland than in England—Mr. Waller's improvements in Meath—Lord Masserene—Lord Farnham—the Earl of Rosse—Sir H. V. Tempest . 77

CHAPTER VI.—THE LONG-HORNS.—Originally from Craven—the larger and smaller breed—early improvers—the blacksmith of Linton—Sir Thomas Gresley—Mr. Webster—Bloxedge—Robert Bakewell—his principles—his success—anecdotes—Twopenny—Mr. Fowler—Shakspeare—Description of D—Mr. Fowler's sale—Mr. Prinsep—Description of the Improved Leicesters—strangely rapid deterioration and disappearance of them—DERBYSHIRE—description of cattle—SHROPSHIRE—the old Shopshires—the present breed . . . 81

CHAPTER VII.—THE SHORT-HORNS.—Description of the old breed—Sir W. St. Quintin—Mr. Milbank—Mr. C. Colling—history of his purchase of Hubback—Favorite—the Durham ox—cross with the polled Galloway—Bolingbroke—Johanna—Lady—prices fetched by Lady's progeny—sale of Mr. C. Colling's stock—Mr. Charge of Newton—Mr. Mason of Chilton—Mr. G. Coates's Short-Horn Herd-Book—history of remarkable short-horns—the milking properties of the improved short-horn undervalued—not calculated for work—corrections of Berry—his two histories of Short-horns—Dutch cattle not imported—Dobison—Bailey—Culley—law against importation—Short-horns not crossed with white wild cattle—C. Colling not exclusive improver of Short-horns—Colling increased the size of his cattle—Hubback had no Dutch blood—an account of him—Galloway crosses or alloy—made by chance—R. Colling.

The improved Yorkshire cow—she unites the two qualities—quantities of milk yielded by her—description of her—YORKSHIRE—NORTH RIDING once occupied by black cattle alone—succeeded by the old Holderness—crossed with the improved breed—WEST RIDING—Mr. Mitton's Badsworth—LINCOLNSHIRE—the unimproved Lincolns—the present improved Lincolns—the Lincolnshire ox 95

CHAPTER VIII.—THE FOREIGN BREEDS OF CATTLE.—The Alderney—quantity and excellence of milk—fattens readily—Nagore cattle 138

CHAPTER IX.—THE STRUCTURE AND DISEASES OF THE HEAD OF THE OX.—The skeleton—the head—shortness and breadth of forehead in the bull—fine small head in the female—extent of frontal sinuses—inflammation of them—the horns—their growth—treatment of fracture of them—age as indicated by the horns—the distinguishing character of the different breeds—influence of sex—horned Galloways—comparison between the horned and hornless cattle—The brain—peculiar conformation of the brain and spinal marrow—The ear—difference of in different cattle—diseases of—The eye—fracture of the orbit—wounds, tumors—The eyelids—eruptions on them—enlargement of haw—inflammation of the eye—cataract—gutta serena—cancer—Fracture of the skull—Hydatids in the brain—water in the head—apoplexy—inflammation of the brain—locked jaw—epilepsy—palsy—neurotomy—madness 142

Chapter X.—The Anatomy, Uses, and Diseases, of the Nostrils and Mouth.—The nasal bones—sense of smelling acute—bleeding from the nose—leeches in it—polypus—coryza—glanders—farcy—The bones of the mouth—the lips—the bars of the mouth—the pad in the upper jaw—the teeth—the age indicated by them—the tongue—the os hyoides—gloss-anthrax or blain—thrush in the mouth—the glands and blood-vessels of the neck—the parotid gland—barbs or paps—the soft palate—the pharynx 179

Chapter XI.—Anatomy and Diseases of the Neck and Chest.—The muscles of the neck and chest—the crest of the bull—form and size of the neck—arteries of the neck—bleeding—bleeding places—the milk-vein with reference to bleeding—The heart—inflammation of its bag—the bone of the heart—the pulse—the capillary vessels—inflammation—Fever—inflammatory fever—quarter-evil—black quarter—typhus fever—The veins—varicose veins—The structure and form of the chest—the brisket—indications of its different forms—The ribs—proper form and direction of—the spine—the larynx—the round curled form of the epiglottis—the windpipe—tracheotomy—the sweetbread—the bronchial tubes—catarrh or hoose—epidemic catarrh—the malignant epidemic—murrain—epidemic sore mouth and feet of 1840—sore throat—inflammation of the pharynx—puncturing the pharynx—bronchitis—multitude of worms often found in the air-passages—inflammation of the lungs—acute pneumonia—epidemic ditto—pleurisy—chronic pleurisy—consumption—importance of recognizing the peculiar cough of consumption 208

Chapter XII.—The Structure and Diseases of the Gullet and Stomach.—The peculiar structure of the gullet of ruminants—choking—the œsophagus-probang—stricture of the gullet—rupture of ditto—the œsophagean canal—the rumen or paunch—the reticulum or honeycomb—the manyplus or manifolds—the abomasum or fourth stomach—the œsophagean canal continued—the muscular pillars of its floor—they yield to a solid substance—circumstances under which fluids pass over them into the third and fourth stomachs, or between them into the rumen—the food macerated in the rumen—passes through all the compartments of it—thrown into the reticulum—its honeycomb structure—the pellet formed—forced into the œsophagean canal—re-ascends the gullet—remasticated—returned—passes along the canal into the manyplus—the leaves of the manyplus—the fibrous parts of the food—indigestible substances in the paunch—concretions in ditto—distension of the rumen from food—ditto from gas—hoove—the stomach pump—the chloride of lime—loss of cud—poisons—yew—corrosive sublimate—diseases of the reticulum—diseases of the manifolds—clew-bound—fardel-bound—malformation of manyplus—diseases of the fourth stomach 278

Chapter XIII.—The Anatomy and Diseases of the Spleen, Liver, and Pancreas.—Anatomy and function of the spleen—inflammation of it—enlargement—The liver—inflammation of it—hæmorrhage—jaundice or yellows—The pancreas 319

Chapter XIV.—The Anatomy and Diseases of the Intestines.—The duodenum—jejunum—ileum—cæcum—colon—rectum—enlargement of the mesenteric glands—inflammation of the bowels—wood-evil—moor-ill—diarrhœa—dysentery—colic—strangulation—the cords or gut-tie—introsusception—inversion of the rectum—constipation—calculi—worms—dropsy—hernia or rupture . . 329

Chapter XV.—The Urinary Organs and their Diseases.—The kidneys—red water—black water—inflammation of the kidneys—the ureters—the bladder—urinary calculi—stone in the kidney—ureters—bladder—urethra—rupture of the bladder—inversion of ditto 366

Chapter XVI.—Parturition.—Abortion or slinking—symptoms of pregnancy—treatment before calving—natural labor—the ergot of rye—mechanical assistance—unnatural presentation—free-martins—the Cæsarian operation—embryotomy—inversion of the womb—rupture of ditto—protrusion of the bladder—retention of the fœtus—attention after calving—the cleansing—flooding—dropping after calving—puerperal or milk fever—sore teats—garget—milk-sickness or trembles—cow-pox 382

Chapter XVII.—The Diseases and Management of Calves.—Navel-ill—constipation—diarrhœa—hoove—castration—method of castration by torsion . 422

Chapter XVIII.—The Diseases of the Muscular System and the Extremities.—Rheumatism—swellings of the joints—ulcers about the joints—opened joints—sprains—diseases of the feet—foul in the feet 428

Chapter XIX.—The Diseases of the Skin.—Structure of the skin—sensible and insensible perspiration—hide-bound—mange—mad itch—lice—warbles—angle-berries—warts 438

Chapter XX.—A List of the Medicines Used in the Treatment of the Diseases of Cattle.—Æthiop's mineral—aloes—alteratives—alum—ammonia—anodynes—antimonial powder—blue vitriol—butyr of antimony—antispasmodics—astringents—blisters—calamine—colombo—calomel—camphor—cantharides—carraways—castor oil—catechu—caustics—chalk—chamomile—charges—chloride of lime—clysters—cordials—corrosive sublimate—croton—diaphoretics—digitalis—diuretics—drinks—elder—emetic tartar—Epsom salts—fomentations—gentian—ginger—Glauber's salts—Goulard's extract—hellebore, black—iodine—ipecacuanha—laudanum—linseed—linseed oil—lunar caustic—mashes—mercurial ointment—mint—myrrh—nitre—pitch—poultices—ergot of rye—common salt—setons—spirit of nitrous ether—spirit, rectified—sugar of lead—sulphur—tar—tonics—turpentine, common—turpentine, spirit of—vinegar—white lead—white vitriol 447

CHAPTER I.

THE NATURAL HISTORY OF THE OX.

The Ox belongs to the class *mammalia*, animals having mammæ, or teats; the order *ruminantia*, ruminating, or chewing their food a second time; the tribe *bovidæ*, the ox kind; the genus *bos*, the ox, the horns occupying the crest, projecting at first sideways, and being porous or cellular within; and the sub-genus *bos taurus*, or the domestic ox.

Distinguished according to their teeth, they have eight *incisors*, or cutting teeth, in the lower jaw, and none in the upper. They have no tusks, but they have six *molars*, or grinding teeth, in each jaw, and on each side.

The whole would, therefore, be represented as follows:—

The ox, incisors $\frac{0}{8}$, canines $\frac{0}{0}$, molars $\frac{6}{6}$-$\frac{6}{6}$. Total, 32 teeth.

The native country of the ox, reckoning from the time of the flood, was the plains of Ararat, and he was a domesticated animal when he issued from the ark. He was found wherever the sons of Noah migrated, for he was necessary to the existence of man; and even to the present day, wherever man has trodden, he is found in a domesticated or wild state. The earliest record we have of the ox is in the sacred volume. Even in the antediluvian age, soon after the expulsion from Eden, the sheep had become the servant of man; and it is not improbable that the ox was subjugated at the same time. It is recorded that Jubal, the son of Lamech, who was probably born during the life-time of Adam, was the father of such as have cattle.

The records of profane history confirm this account of the early domestication and acknowledged value of this animal, for it was worshipped by the Egyptians, and venerated among the Indians. The traditions of every Celtic nation enroll the cow among the earliest productions, and represent it as a kind of divinity.

The parent race of the ox is said to have been much larger than any of the present varieties. The Urus, in his wild state at least, was an enormous and fierce animal, and ancient legends have thrown around him an air of mystery. In almost every part of the Continent, and in every district of England, skulls, evidently belonging to cattle, have been found, far exceeding in bulk any now known. There is a fine specimen in the British Museum: the peculiarity of the horns will be observed, resembling smaller ones dug up in the mines of Cornwall, preserved, in some degree, in the wild cattle of Chillingham Park, and not quite lost in our native breeds of Devon and East Sussex, and those of the Welsh mountains and the Highlands. We believe that this referred more to individuals than to the breed generally, for there is no doubt that, within the last century, the size of the cattle has progressively increased in England, and kept pace with the improvement of agriculture.

We will not endeavor to follow the migrations of the ox from Western Asia, nor the change in size, and form, and value, which it underwent, according to the difference of climate and of pasture, as it journeyed on toward the west, for there are no records of this on which dependence can be placed; but we will proceed to the subject of the present work, the British Ox.

CHAPTER II.

THE BRITISH OX.

In the earliest and most authentic account that we possess of the British Isles, the Commentaries of Cæsar, we learn that the Britons possessed great numbers of cattle. No satisfactory description of these cattle occurs in any ancient author; but they, with occasional exceptions, possessed no great bulk or beauty.

Cæsar tells us that the Britons neglected tillage, and lived on milk and flesh; and other authors corroborate this account of the early inhabitants of the British Islands. It was that occupation and mode of life which suited their state of society. The island was divided into many petty sovereignties; no fixed property was secure; and that alone was valuable which might be hurried away at the threatened approach of an invader. Many centuries after this, when, although one sovereign seemed to reign paramount over the whole of the kingdom, there continued to be endless contests among the feudal barons, and still that property alone was valuable which could be secured within the walls of the castle, or driven beyond the invader's reach; an immense stock of provisions was always stored up in the various fortresses, both for the vassals and the cattle; or it was contrived that the latter should be driven to the demesnes of some friendly baron, or concealed in some inland recess.

When the government became more powerful and settled, and property of every kind was proportionably secured, as well as more equally divided, the plough came into use; and agricultural productions were oftener cultivated, the reaping of which was sure after the labor of sowing. Cattle were now comparatively neglected, and, for some centuries, injuriously so. Their numbers diminished, and their size appears to have diminished, too; and it is only within the last 150 years that any serious and successful efforts have been made materially to improve them.

In the comparative roving and uncertain life which our earlier and later ancestors led, their cattle would sometimes stray and be lost. The country was then overgrown with forests, and the beasts betook themselves to the recesses of these woods, and became wild, and sometimes ferocious. They, by degrees, grew so numerous, as to be

dangerous to the inhabitants of the neighboring districts. One of the chronicles informs us, that many of them harbored in the forests in the neighborhood of the metropolis. Strange stories are told of some of them, and doubtless, when irritated, they were fierce and dangerous enough. As, however, civilization advanced, and the forests became thinned and contracted, these animals were seldomer seen, and at length almost disappeared. A few of them yet remain in Chatelherault Park, belonging to the Duke of Hamilton, in Lanarkshire; and in the park of Chillingham Castle, in Northumberland, the seat of the Earl of Tankerville.

The wild breed, from being untameable, can only be kept within walls, or good fences; consequently, very few of them are now to be met with, except in the parks of some gentlemen, who keep them for ornament, and as a curiosity. Their color is invariably white, muzzle black; the whole of the inside of the ear, and about one-third of the outside, from the tips downward, red; horns, white, with black tips, very fine, and bent upward; some of the bulls have a thin, upright mane, about an inch and a half or two inches long. The weight of the oxen is from thirty-five to forty-five stone, and the cows from twenty-five to thirty-five stone the four quarters (fourteen pound to the stone). The beef is finely *marbled*, and of excellent flavor. The six year old oxen are generally very good beef; whence it may be fairly supposed that, in proper situations, they would feed well.

At the first appearance of any person, they set off in full gallop, and, at the distance of about two hundred yards, make a wheel round, and come boldly up again in a menacing manner; on a sudden they make a full stop at the distance of forty or fifty yards, looking wildly at the object of their surprise; but upon the least motion they all again turn round, and fly off with equal speed, but not to the same distance, forming a shorter circle, and again returning with a more threatening aspect than before; they approach probably within thirty yards, when they again make another stand, and then fly off; this they do several times, shortening their distance, and advancing nearer and nearer, till they come within such a short distance that most people think it prudent to leave them.

When the cows calve, they hide their calves for a week or ten days in some sequestered situation, and go and suckle them two or three times a day. If any person come near the calves, they clap their heads close to the ground, to hide themselves: this is a proof of their native wildness.

The dams allow no person to touch their calves, without attacking them with impetuous ferocity. When any one happens to be wounded, or is grown weak and feeble through age or sickness, the rest of the herd set on it and gore it to death.

The breeds of cattle, as they are now found in Great Britain, are almost as various as the soil of the different districts, or the fancies

of the breeders. They have, however, been very conveniently classed according to the comparative size of the horns; the *long horns*, originally from Lancashire, much improved by Mr. Bakewell, of Leicestershire, and established through the greater part of the midland counties; the *short horns*, mostly cultivated in the northern counties, and in Lincolnshire, and many of them found in every part of the kingdom where the farmer attends much to his dairy, or a large supply of milk is wanted; and the *middle horns*, not derived from a mixture of the two preceding, but a distinct and valuable and beautiful breed, inhabiting principally the north of Devon, the east of Sussex, Herefordshire, and Gloucestershire; and, of diminished bulk, and with somewhat different character, the cattle of the Scottish and the Welsh mountains. The Alderney, with her *crumpled horn*, is found on the southern cost, and, in smaller numbers, in gentlemen's parks and pleasure-grounds every where; while the polled, or *horn-less* cattle, prevail in Suffolk, and Norfolk, and in Galloway, whence they were first derived.

These, however, have been intermingled in every possible way. They are found pure only in their native districts, or on the estates of some opulent and spirited individuals. Each county has its own mongrel breed, often difficult to be described, and not always to be traced—neglected enough, yet suited to the soil and to the climate; and, among little farmers, maintaining their station, in spite of attempts at improvements by the intermixture or the substitution of foreign varieties.

The character of each important variety, and the relative value of each for breeding, grazing, the dairy, or the plough, will be considered before we inquire into the structure or general and medical treatment of cattle. Much dispute has arisen as to the original breed of British cattle. The battle has been stoutly fought between the advocates of the middle and the long horns. The short horns and the polls can have no claim; the latter, although it has existed in certain districts from time immemorial, was probably an accidental variety.

We are very much disposed to adjudge the honor to the "*middle horns.*" The *long horns* are evidently of Irish extraction, as in due place we shall endeavor to show.

Britain has shared the fate of other nations, and oftener than they, has been overrun and subjugated by invaders. As the natives retreated, they carried with them some portion of their property, which, in those early times, consisted principally in cattle. They drove along with them as many as they could, when they retired to the fortresses of north Devon and Cornwall, or the mountainous regions of Wales, or when they took refuge in the wealds of east Sussex; and there, retaining all their prejudices, customs and manners,

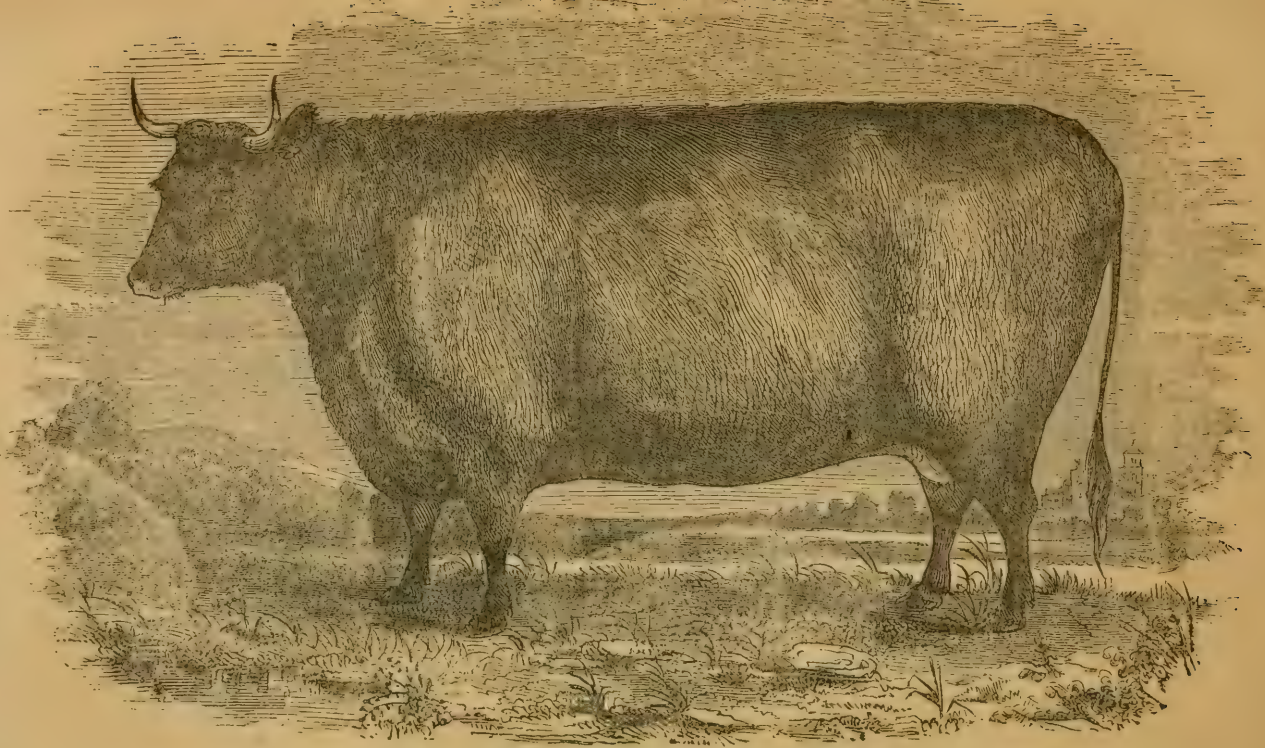
were jealous of the preservation of that which reminded them of their native country before it yielded to a foreign yoke.

In this manner was preserved the ancient breed of British cattle. Difference of climate wrought some change, particularly in their bulk. The rich pasture of Sussex fattened the ox into its superior size and weight. The plentiful, but not so luxuriant herbage of the north of Devon, produced a smaller and more active animal, while the privations of Wales lessened the bulk and thickened the hide of the Welsh runt. As for Scotland, it set its invaders at defiance; or its inhabitants retreated for a while, and soon turned again on their pursuers. They were proud of their country, of their cattle, their choicest possession; and there, too, the cattle were preserved, unmixed and undegenerated.

Thence it resulted, that in Devon, in Sussex, in Wales, and in Scotland, the cattle have been the same from time immemorial; while in all the eastern coast, and through every district of England, the breed of cattle degenerated, or lost its original character; it consisted of animals brought from every neighboring and some remote districts, mingled in every possible variety, yet conforming itself to the soil and the climate.

Observations will convince us that the cattle in Devonshire, Sussex, Wales, and Scotland, are essentially the same. They are middle horned; not extraordinary milkers, and remarkably for the quality rather than the quantity of their milk; active at work; and with an unequalled aptitude to fatten. They have all the characters of the same breed, changed by soil, climate, and time, yet little changed by man. We may almost trace the color, namely, the red of the Devon, the Sussex, and the Hereford; and where the black alone are now found, the memory of the red prevails. Every one who has compared the Devon cattle with the wild breed of Chatelherault park, or Chillingham castle, has been struck with the great resemblance in many points, notwithstanding the difference of color, while they bear no likeness at all to the cattle of the neighboring country.

For these reasons we consider the middle horns to be the native breed of Great Britain, and they shall first pass in review before us.



Mr. A. Stevens' Prize Devon Cow.

Winner of the first prize for Devon Cows, at the Show of the New York State Agricultural Society, at Syracuse, in 1849.

CHAPTER III.

THE MIDDLE HORNS.

THE DEVONS.

The north of Devon has been long celebrated for a breed of cattle beautiful in the highest degree, and in activity at work and aptitude to fatten unrivalled. The native country of the Devons, and where they are found in a state of the greatest purity, extends from the river Taw westward, skirting along the Bristol Channel; the breed becoming more mixed, and at length comparatively lost before we arrive at the Parrett. Inland it extends by Barnstaple, South Molton, and Chumleigh, as far as Tiverton, and thence to Wellington, where again the breed becomes unfrequent, or it is mixed before we reach Taunton. More eastward the Somersets and the Welsh mingle with it, or supersede it. To the south there prevails a larger variety, a cross probably of the Devon with the Somerset; and on the west the Cornish cattle are found, or contaminate the breed. The Devonshire man confines them within a narrower district, and will scarcely allow them to be found with purity beyond his native county. From Portlock to Biddeford, and a little to the north and the south, is, in his mind, the peculiar and only residence of the true Devon.

From the earliest records the breed has here remained the same; or if not quite as perfect as at the present moment, yet altered in no essential point until within the last thirty years. That is not a little surprising when it is remembered that a considerable part of this district is not a breeding country, and that even a proportion, and that not a small one, of Devonshire cattle, are bred out of the county. On the borders of Somerset and Dorset, and partly in both, extending southward from Crewkern, the country assumes the form of an extensive valley, and principally supplies the Exeter market with calves. Those that are dropped in February and March, are kept until May, and then sold to the drovers, who convey them to Exeter. They are there purchased by the Devonshire farmers, who keep them for two or three years, when they are sold to the Somersetshire graziers, who fatten them for the London market; so that a portion of the Devons, and of the very finest of the breed, come from Somerset and Dorset.

The truth is, that the Devonshire farmers were, until the last century, not conscious that they possessed anything superior to other breeds; but, like agriculturists everywhere else, they bought and bred without care or selection. It is only within the last one hundred and fifty or sixty years that any systematic efforts have been made to improve the breeds of cattle of the kingdom; and we must acknowledge, that the Devonshire men, with all their advantages, and with such good ground to work upon, were not the first to stir, and, for a time, were not the most zealous when they were roused to exertion. They are indebted to the nature of their soil and climate for the beautiful specimens which they possess of the native breed of our island, and they have retained this breed almost in spite of themselves.

A spirit of emulation was at length kindled, and even the Devons have been materially improved, and brought to such a degree of perfection, that, take them all in all, they would suffer from intermixture with any other breed.

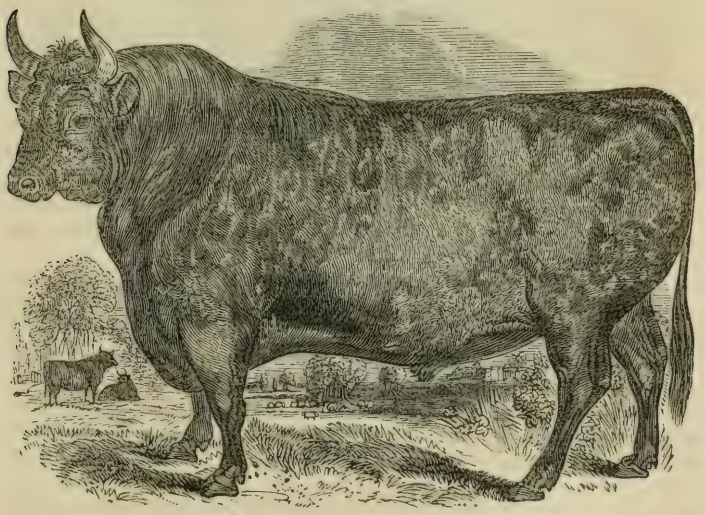
Whatever be the breed, there are certain conformations which are indispensable to the thriving and valuable ox or cow. When we have a clear idea of these, we shall be able more easily to form an accurate judgment of the different breeds. If there is one part of the frame, the form of which, more than of any other, renders the animal valuable, it is the chest. There must be room enough for the heart to beat, and the lungs to play, or sufficient blood for the purposes of nutriment and of strength will not be circulated; nor will it thoroughly undergo that vital change which is essential to the proper discharge of every function. We look, therefore, first of all to the wide and deep girth about the heart and lungs. We must have both: the proportion in which the one or the other may preponderate, will depend on the service we require from the animal; we can excuse a slight degree of flatness on the sides, for he will be lighter in the forehand, and more active; but the grazier must have width as well as depth. Not only about the heart and lungs, but over the whole of the ribs, must we have both length and roundness; the *hooped*, as well as the deep barrel is essential; there must be room for the capacious paunch, room for the materials from which the blood is to be provided. There should be little space between the ribs and the hips. This seems to be indispensable in the ox, as it regards a good healthy constitution, and a propensity to fatten; but a largeness and drooping of the belly is excusable in the cow, or rather, though it diminishes the beauty of the animal, it leaves room for the udder; and if it is also accompanied by swelling milk veins, it generally indicates her value in the dairy.

This roundness and depth of the barrel, is most advantangeous in proportion as it is found behind the point of the elbow, more than between the shoulders and legs; or low down between the legs.

rather than upward toward the withers : for it diminishes the heaviness before, and the comparative bulk of the coarser parts of the animal, which is always a very great consideration.

The loins should be wide, for they are the prime parts; they should extend far along the back : and although the belly should not hang down, the flanks should be round and deep. The hips, without being ragged, should be large ; round rather than wide, and presenting, when handled, plenty of muscle and fat The thighs should be full and long, close together when viewed from behind, or have a good twist, and the farther down they continue close the better. The legs short, varying like other parts according to the destination of the animal ; but decidedly short, for there is an almost inseparable connection between length of leg and lightness of carcass, and shortness of leg and propensity to fatten. The bones of the legs, and they only, being taken as a sample of the bony structure of the frame, generally, should be small, but not too small—small enough for the well-known accompaniment, a propensity to fatten ; but not so small as to indicate delicacy of constitution, and liability to disease.

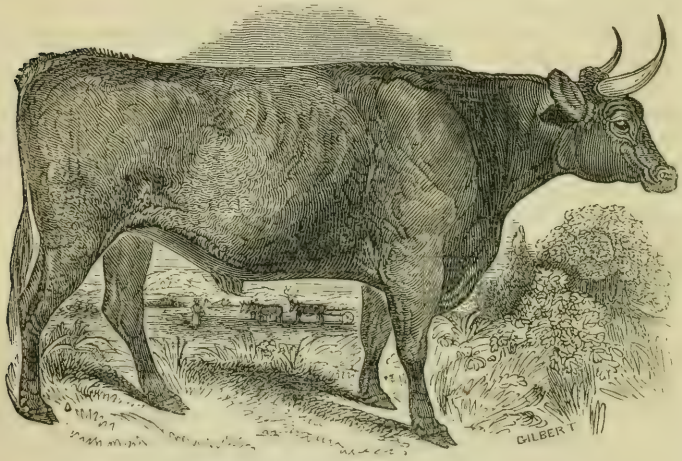
Last of all, the hide—the most important thing of all—thin, but not so thin as to indicate that the animal can endure no hardship ; movable, mellow, but not too loose, and particularly well covered with fine long and soft hair. We shall enter more fully and satisfactorily into this subject in the proper place ; but this bird's-eye view may be useful. We return to the Devon cattle.



DEVON BULL.

The more perfect specimens of the Devon breed are thus distinguished. The horn of the *bull* ought to be neither too low nor too high, tapering at the points, not too thick at the root, white below, and of a yellow or waxy color at the tip. The eye should be clear, bright, and prominent, showing much of the white, and have around it a circle of a dark orange color. The forehead should be flat, indented, and small, for, by the smallness of the forehead, the purity of the breed is very much estimated. The cheek should be small, and the muzzle fine: the nose must be of a clear yellow. The nostril should be high and open: the hair curled about the head. The neck should be thick, and that sometimes almost to a fault.

Excepting in the head and neck, the form of the bull does not materially differ from that of the ox, but he is considerably smaller. There are exceptions, however, to this rule.



WORKING DEVON OX.

The head of the ox is small, very singularly so, relatively to his bulk; yet it has a striking breadth of forehead, It is clean and free from flesh about the jaws. The eye is very prominent, and the animal has a pleasing vivacity of countenance, distinguishing it from the heavy aspect of many other breeds. Its neck is long and thin, admirably adapting it for the collar, or the more common and ruder yoke.

It is accounted one of the characters of good cattle, that the line of the neck from the horns to the withers should scarcely deviate

from that of the back. In the Devon ox, however, there is a peculiar rising of the forehand, reminding us of the blood-horse, and essentially connected with the free and quick action by which this breed has ever been distinguished. It has little or no dewlap depending from its throat. The horns are longer than those of the bull, smaller, and fine even to the base, and of a lighter color, and tipped with yellow. The animal is light in the withers; the shoulders a little oblique; the breast deep, and the bosom open and wide, particularly as contrasted with the fineness of the withers. The fore-legs are wide apart, looking like pillars that have to support a great weight. The point of the shoulder is rarely or never seen. There is no projection of bone, but there is a kind of level line running on to the neck.

These are characteristic and important points. Angular bony projections are never found in a beast that carries much flesh and fat. The fineness of the withers, the slanting direction of the shoulder, and the broad and open breast, imply strength, speed, and aptitude to fatten. A narrow-chested animal can never be useful either for working or grazing.

With all the lightness of the Devon ox, there is a point about him, disliked in the blood or riding-horse, and not approved in the horse of light draught—the legs are far under the chest, or rather the breast projects far and wide before the legs. We see the advantage of this in the beast of slow draught, who rarely breaks into a trot, except when he is goaded on in *catching times*, and the division of whose foot secures him from stumbling. The lightness of the other parts of his form, however, counterbalances heaviness here.

The legs are straight, at least in the best herds. If they are in-kneed, or crooked in the fore-legs, it argues a deficiency in blood, and comparative incapacity for work; and for grazing, too, for they will be hollow behind the withers, a point for which nothing can compensate, because it takes away so much from the place where good flesh and fat should be thickly laid on, and diminishes the capacity of the chest and the power of creating arterial and nutritious blood.

The fore-arm is particularly large and powerful. It swells out suddenly above the knee, but is soon lost in the substance of the shoulder. Below the knee, the bone is small to a very extraordinary degree, indicating a seeming want of strength; but this impression immediately ceases, for the smallness is only in front—it is only in the bone: the leg is deep, and the sinews are far removed from the bone, promising both strength and speed. It may perhaps be objected that the leg is a little too long. It would be so in an animal destined only to graze; but this is a working animal, and some length of leg is necessary to get him actively over the ground.

There is a very trifling fall behind the withers, but no *hollowness*, and the line of the back is straight from them to the setting on of the

tail. If there is any seeming fault in the beast, it is that the sides are a little too flat. It will appear, however, that this does not interfere with feeding, while a deep, although somewhat flat chest is best adapted for speed.

The two last ribs are particularly bold and prominent, leaving room for the stomachs and other parts concerned in digestion to be fully developed. The hips, or huckles, are high up, and on a level with the back, whether the beast is fat or lean. The hind quarters, or the space from the hip to the point of the rump, are particularly long, and well filled up—a point of importance both for grazing and working. It leaves room for flesh in the most valuable part, and indicates much power behind, equally connected with strength and speed. This is an improvement quite of modern date. *The fullness here, and the swelling out of the thigh below, are of much more consequence than the prominence of fat which is so much admired on the rump of many prize cattle.*

The setting on of the tail is high; on a level with the back; rarely much elevated or depressed. This is another great point, as connected with the perfection of the hind quarters. The tail itself is long and small, and taper, with a round bunch of hair at the bottom.

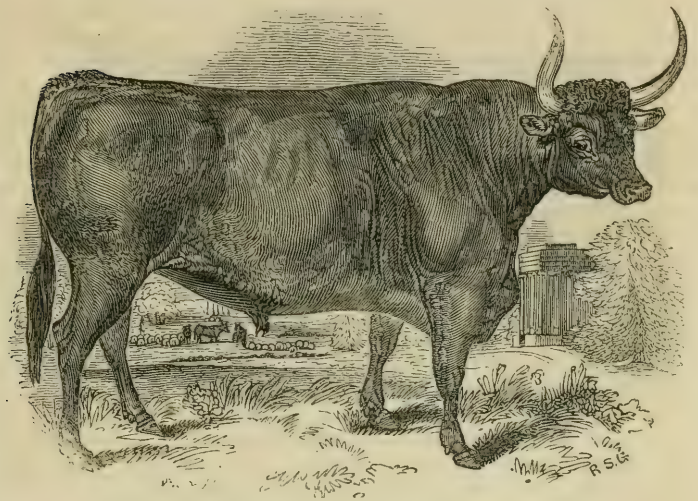
The skin of the Devon, with his curly hair, is exceedingly mellow and elastic. *Graziers know that there is not a more important point than this. When the skin can be easily raised from the hips, it shows that there is room to set on fat below.*

The skin is thin rather than thick. Its appearance of thickness arises from the curly hair with which it is covered, and curly in proportion to the condition and health of the animal. These curls run like little ripples on water. Some of these cattle have the hair smooth, but then it should be fine and soft. Those with curled hair are more hardy, and fatten more kindly. The favorite color is a blood red. This is supposed to indicate purity of breed; but there are many good cattle approaching almost to a bay dark. If the eye is clear and good, and the skin mellow, the paler colors will bear hard work, and fatten as well as others; but a beast with pale hair, and hard under the hand, and the eye dark and dead, will be a sluggish worker, and an uprofitable feeder. Those of a yellow color are said to be subject to diarrhœa, or scouring.

These are the principal points of a good Devon ox; but he used to be, perhaps is yet, a little too flat-sided, and the rump narrowed too rapidly behind the hip bones; there was too much space between the hip bones and the last rib; and he was too light for tenacious and strong soils.

A selection from the most perfect animals of the true breed—the bone still small and the neck fine, but the brisket deep and wide, and down to the knees, and not an atom of flatness all over the side—these have improved the strength and bulk of the Devon ox, without

impairing, in the slightest degree, his activity, his beauty, or his propensity to fatten.

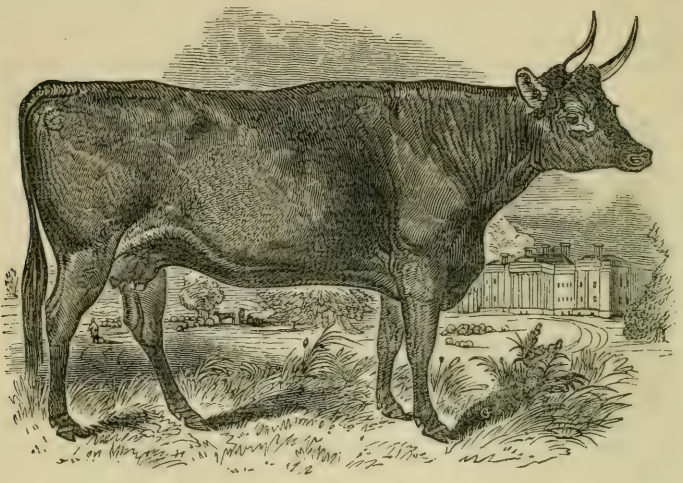


DEVON OX.

Commencing to Feed.

There are few things more remarkable about the Devon cattle than the comparative smallness of the cow. The bull is a great deal less than the ox, and the cow smaller than the bull. This is some disadvantage, and the breeders are aware of it; for, although it may not be necessary to have a large bull, and especially as those of any extraordinary size are seldom handsome in all their points, but somewhere or other present coarseness or deformity, it is almost impossible to procure large and serviceable oxen, except from a somewhat *roomy* cow. These cows, however, although small, possess that roundness and projection of the two or three last ribs, which make them actually more *roomy* than a careless examination of them would indicate. The cow is particularly distinguished for her full, round, clear eye, the gold-colored circle round the eye, and the same color on the inside skin of the ear. The countenance cheerful, and the muzzle orange or yellow. The jaws free from thickness, and the throat from dewlap. The points of the back and the hind quarters different from those of other breeds, having more of roundness and beauty, and being free from angles.

The qualities of the Devons may be referred to three points; their working, fattening, and milking.



DEVON COW.[4]

Where the ground is not too heavy, the Devon oxen are unrivalled at the plough. They have a quickness of action which no other breed can equal, and very few horses exceed. They have a docility and goodness of temper, and stoutness and honesty of work, to which many horses cannot pretend. It is a common day's work, on fallow land, for four Devon steers to plough two acres with a double furrow plough. Four good steers will do as much work in the field, or on the road, as three horses, and in as quick, and often quicker time, although farmers calculate two oxen equal to one horse. The principal objection to Devon oxen is, that they have not sufficient strength for tenacious, clayey soils: they will, however, exert their strength to the utmost, and stand many a dead pull, which few horses could be induced or forced to attempt. They are uniformly worked in yokes, and not in collars. Four oxen, or six growing steers, are the usual team employed in the plough.

The opponents of ox-husbandry should visit the valleys of north or south Devon, to see what this animal is capable of performing, and how he performs it.

The profit derived from the use of oxen in this district arises from the activity to which they are trained, and which is unknown in any other part of the kingdom. During harvest time, and in catching weather, they are sometimes trotted along with the empty wagons,

at the rate of six miles an hour, a degree of speed which no other ox but the Devon has been able to stand.

It may appear singular to the traveler, that in some of the districts that are supposed to be the very head-quarters of the Devon cattle, they are seldom used for the plough. The explanation, however, is plain enough. The demand for them among graziers is so great, that the breeders obtain a remunerating price for them at an earlier age than that at which they are generally broken in for the plough.

They are usually taken into work at about two years old, and are worked until they are four, or five, or six; they are then grazed, or kept on hay, and in ten or twelve months, and without any further trouble, are fit for the market. If the grass land is good, no corn, or cake, or turnips, are required for the first winter; but, of course, for a second winter these must be added. The grazier likes this breed best at five years old, and they will usually, when taken from the plough, fetch as much money as at six. At eight or nine years, or older, they are rapidly declining in value.

After having been worked lightly on the hills for two years, they are bought at four years old by the tillage-farmer of the vales, and taken into hard work from four to six; and, what deserves consideration, an ox must be thus worked in order for him to attain his fullest size. If he is kept idle until he is five or six, he will invariably be stinted in his growth. At six he reaches his full stature, unless he is naturally disposed to be of more than ordinary size, and then he continues to grow for another half year. The Devon oxen are rarely shod, and very rarely lame.

Their next quality is their disposition to fatten, and very few rival them here. Some very satisfactory experiments have been made on this point. They do not, indeed, attain the great weight of some breeds; but, in a given time, they acquire more flesh, and with less consumption of food, and their flesh is beautiful in its kind. It is mottled, or marbled, so pleasing to the eye and to the taste.

For the dairy, the Devons must be acknowledged to be inferior to several other breeds. The milk is good, and yields more than an average proportion of cream and butter; but generally it is deficient in quantity. There are those, however, and no mean judges, who deny this, and select the Devons even for the dairy.

Such is not, however, the common opinion. They are kept principally for their other good qualities, in order to preserve the breed; and because, as nurses, they are indeed excellent, and the calves thrive from their small quantity of milk more rapidly than could possibly be expected.

This aboriginal breed of British cattle is a very valuable one, and seems to have arrived at the highest point of perfection. It is heavier than it was thirty years ago, yet fully as active. Its

aptitude to fatten is increased, and its property as a milker might be improved, without detriment to its grazing qualities.

Those points in which the Devons were deficient thirty years ago, are now fully supplied, and all that is now wanting, is a judicious selection of the most perfect of the present breed, in order to preserve it in its state of greatest purity. Many of the breeders are as careless as they ever were ; but the spirit of emulation is excited in others. Mr. Davy, of North Molton, lately sold a four-year old bull, for which the purchaser had determined to give one hundred guineas had it been asked.

The Devon cattle are more than usually free from disease. The greater part of the maladies of cattle, and all those of the respiratory system, are owing to injudicious exposure to cold and wet; the height and thickness of the Devonshire fences, as affording a comfortable shelter to the cattle, may have much to do with this exemption from disease.

The Devons have been crossed with the Guernsey breed, and the consequence has been, that they have been rendered more valuable for the dairy ; but they have been so much injured for the plough, and for the grazier, that the breeders are jealous to preserve the old stock in their native purity.

The treatment of the calf is nearly the same in every district of North Devon. The calves that are dropped at Michaelmas, and some time afterward, are preferred to those that come in February, notwithstanding the additional trouble and expense during the winter. The calf is permitted to suck three times every day for a week. It is then used to the finger, and warm new milk is given it for three weeks longer. For two months afterward it has plenty of warm scalded milk, mixed with a little finely-powdered linseed-cake. Its morning and evening meals are then gradually lessened ; and, when it is four months old, it is quite weaned,

Of the other districts of Devonshire little need be said. Toward the south, extending from Hartland towards Tiverton, the Devons prevail, and in their greatest state of purity. There are more dairies than in the north, and supplied principally by the Devon cows. Such are the differences of opinion even in neighboring districts, that the later calves are here uniformly preferred, which are longer suckled, and afterward fed with milk and linseed-meal.

Advancing more to the south, and toward the borders of Cornwall, a different breed presents itself, heavier and coarser. We have arrived now in the neighborhood of Devonport, where larger cattle are required for the service of the navy ; but we must go a little more to the south, and enter on the tract of country which extends from Tavistock to Newton Abbott, before we have the South Devons in full perfection. They are a mixture of the Devons with the native breed of the country ; and so adapted do they seem to be to the

soil, that all attempts to improve them, so far as grazing and fattening go, have utterly failed. They are often 14 cwt. to the four quarters; and steers of 2½ cwt. are got with fair hay and grass to weigh from six to nine cwt. They bear considerable resemblance to the Herefords, and sometimes the color, and the horn, and the white face, are so much alike in both, that it is difficult to distinguish between them, except that they are usually smaller than the Herefords.

There are few parts of the country in which there is such bad management, and utter neglect of the preservation of the breed, as in this and the most eastern part of Devon. It is not properly a grazing district, except in the neighborhood of Tavistock; but young cattle are rather brought forward for after-grass or turnips elsewhere than finished here for the market, and the method in which this is conducted is not to be commended. If a calf look likely to fatten, it is suffered to run with the cow ten or twelve months, and then slaughtered. If others, that had not before shown a disposition to thrive, now start, they are forwarded as quickly as may be, and disposed of; and therefore it is that all those that are retained, and by which the stock is to be kept up, are the very refuse of the farm. Yet the breed is not materially deteriorated. It has found a congenial climate, and it will flourish there in spite of neglect and injury. *The grand secret of breeding is to suit the breed to the soil and climate.* It is because this has not been studied, that those breeds, which have been invaluable in certain districts, have proved altogether profitless and unworthy of culture in others. The South Devons are equally profitable for the grazier, the breeder, and the butcher; but their flesh is not so delicate as that of the Devons. They do for the consumption of the navy; they will not suit fastidious appetites.

The farmers in the neigborhood of Dartmoor breed very few cattle. Their calves are usually procured from East Devon, or even from Somerset or Dorset. They are reared at the foot of the moors for the use of the miners. All, however, are not consumed; but the steers are sold to the farmers of the South Hams, who work them as long as they are serviceable; they are then transferred to the graziers from Somersetshire, or East Devon, or Dorset, by whom they are probably driven back to their native country, and prepared for the market of Bristol or London. A very curious peregrination this, which great numbers of the west-country cattle experience.

As we now travel eastward, we begin to lose all distinctness of breed. The vale of Exeter is a dairy district, and, as such, contains all kinds of cattle, according to the fancy of the farmer. There are a few pure Devons, more South Devons, and some Alderneys; but the majority are mongrels of every description: many of them, however, are excellent cows, and such as are found scattered over Cornwall, West Devonshire, Somerset, and part of Dorset.

As we advance along the south and the east, to Teignmouth, Ex-

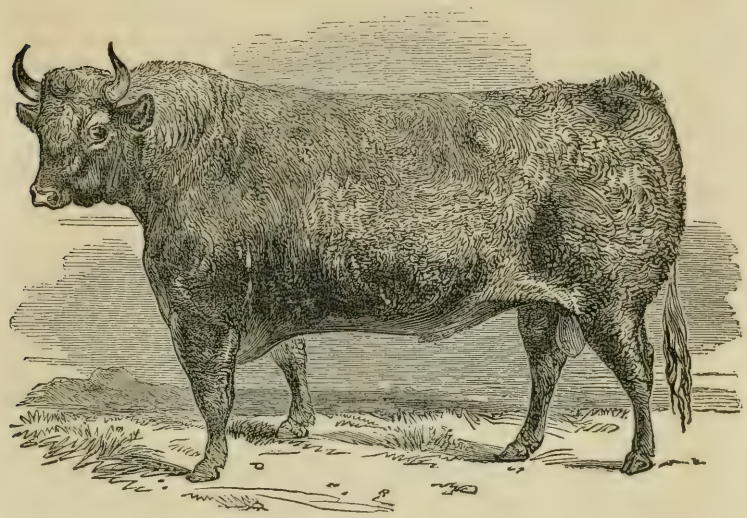
mouth, Sidmouth, and over the hill to the fruitful vale of Honiton, we do not find oxen so much used in husbandry. The soil is either a cold hard clay, or its flints would speedily destroy the feet of the oxen. The same variety of pure Devons and South Devons, and natives of that particular district, with intermixtures of every breed, prevail, but the South Devons are principally seen. Some of these cows seem to unite the opposite qualities of fattening and milking. A South Devon has been known, soon after calving, to yield more than two pounds of butter a day; and many of the old southern native breed are equal to any short horns in the quantity of their milk, and far superior to them in its quality.

The Devon cattle prevail along that part of the county of Somerset which borders on Devon, until we arrive in the neighborhood of Wincaunton and Ilchester, where the pure breed is almost lost sight of. In the north of Somerset, few of the Devons are to be seen; but along the coast, and even extending as far as Bristol and Bath, the purest breed of the Devons is preferred. They are valued for their aptitude to fatten, their quickness and honesty at work; and they are said to be better milkers than in their native county. They are of a larger size, for the soil is better, and the pasturage more luxuriant. It is on this account that the oxen bred in some parts, and particularly in the Vale of Taunton, although essentially Devons, are preferred to those from the greater part of Devonshire, and even from the neighborhood of Barnstaple and South Molton. They are better for the grazier and for the dairy; and, if they are not quite so active as their progenitors, they have not lost their docility and freeness at work, and they have gained materially in strength.

The farmers in the south and south-west of Somerset are endeavoring to breed that sort of cattle that will answer for the pail, and the plough, and grazing—a very difficult point; for those that are of the *highest proof* (exhibiting those points or conformations of particular parts which usually indicate a propensity to fatten) are generally the worst milkers, both as to quantity and quality. This being, however, a dairy county, as well as a grazing one, or more so, the principal point with them is a good show for milk. They are, for the most part, of the Devon red, and the best suited for all purposes of any in the West of England. All that is necessary to keep them up in size and proof, and of a good growth, is to change the bull every two years. This is a very important, although an overlooked and unappreciated principle of breeding, even where the stock is most select. No bull should be longer used by the same grazier, or some degree of deterioration will ensue.

It must, nevertheless, be confessed, that in the greater part of the county, and where the Devons are liked best for husbandry and for grazing, experience has taught many farmers to select another breed for the dairy.

Our cuts of the two Devon bulls given, are portraits of animals of distinction ; the first characterized by great substance, and the second by eminent fineness and style; and both are wanting in nothing essential to the Devon bull, while they are both marked by great excellence.



DEVON BULL.

While our views regard the general breeding of Devons, as seen in the practice of the mass of breeders in Devonshire, it is yet proper to say that there are some few breeders who have carried their cattle forward to a degree of excellence that would seem incapable of further advancement ; and which is now so high that we may perhaps call it perfection. In point of working form they are not deteriorated, and yet they have all the maturity of the short horn, and are equal to any breed in the abundance of meat on the prime parts, and in the high quality of that meat, it being marbled and sparkling in the highest degree.

The leading breeders are Mr. James Quartly, of Champson Molland, and his brother, Mr. John Quartly, of Molland ; Mr. Richard Merson, of Brinsworthy ; and Mr. James Davy, of Flitton Barton, all in Devonshire. Mr. James Quartly has been, more than any other breeder, distinguished as a winner of prizes at the shows of the Royal Agricultural Society of England, and the other gentlemen named have been successful often at these shows, though as the

breeders of the animals shown, more than as the exhibitors. Indeed, Mr. Merson has himself never shown, and yet has bred several animals that have won in the hands of others.

The Messrs. Quartlys, the inheritors of an ancient stock, succeeded to the herds of their father, the late Mr. Quartly, and their uncle, the present Mr. Francis Quartly, who, from age, has declined further breeding. From their predecessors they have obtained both reputation and excellence in their cattle, and they are more than maintaining the high character derived from their father and uncle.*

Mr. Merson, also, succeeded his father as a breeder, and, like his father, ranks at the top of the profession. His cattle are remarkable for an abundance of fine meat on the choice parts, great evenness, very early maturity, and milking quality unsurpassed by any Devons; and indeed their milking capacity, as a herd, is extraordinary, many of his cows equaling the short horns in quantity, while the milk still preserves the known superior richness of the Devon race.

Mr. Davy likewise inherits both the herd and the reputation of his father, a distinguished breeder, and his aim has been, like Mr. Merson's, to have animals not only of great excellence of carcass, but of superior milking capacity.

Mr. George Turner, of Barton, near Exeter, in Devonshire, has in the last few years entered the field of competition with these ancient breeders, and, deriving his cattle from them, is breeding with distinction.

Of late years, Devon bullocks have appeared in the Smithfield Club shows, and, when the numbers exhibited are considered, have been far more successful than any other breed. At a recent show of the Club, there were only thirteen Devons shown, and three won prizes, and that, too, in a competition with one hundred and seven beasts, which were mainly short horns and Herefords. Two of these were exhibited by the Earl of Leicester, and one was good enough to carry off the *Gold Medal*, as the best ox in the yard. The Earl of Leicester, and his father before him, and their tenant, Mr. Bloomfield, all of Norfolk, are well known breeders of Devons. They have derived much of their late blood from the Messrs. Quartlys, Mr. Merson, and Mr. Davy.

* It may be mentioned that animals bred by Messrs. James and John Quartly, won every prize for Devons save one, at the last show of the English Agricultural Society at Exeter, in Devonshire, July, 1850, and this was by far the best and most numerous show of Devons ever made.—Editor.

THE HEREFORDS.

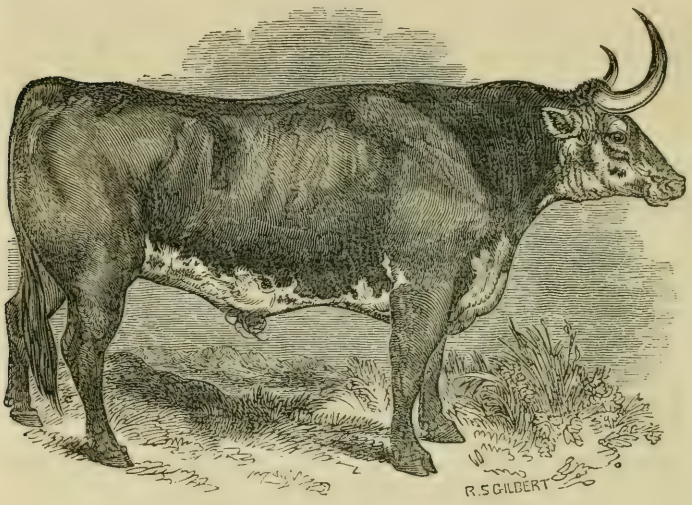
The Hereford white-faced breed, with the exception of a very few Alderney and Durham cows, have almost exclusive possession of the county of Hereford. The Hereford oxen are considerably larger than the Devons. They are usually of a darker red; some of them are brown, and even yellow, and a few are brindled; but they are principally distinguished by their white faces, throats, and bellies. In a few the white extends to the shoulders. The old Herefords were brown, or red-brown, with not a spot of white about them. It is only within the last fifty or sixty years that it has been the fashion to breed for white faces. Whatever may be thought of the change of color, the present breed is certainly far superior to the old one. The hide is considerably thicker than that of the Devon. Compared with the Devons, they are shorter in the leg, and also in the carcass; higher, and broader, and heavier in the chine; rounder and wider across the hips, and better covered with fat; the thigh fuller and more muscular, and the shoulders larger and coarser.

Mr. Marshall gives the following account of them: it is tolerably correct, but does not sufficiently distinguish them from their kindred breed. "The countenance pleasant, cheerful, open; the forehead broad; eye full and lively; horns bright, taper, and spreading; head small; chap lean; neck long and tapering; chest deep; bosom broad, and projecting forward; shoulder-bone thin, flat, no way protuberant in bone, but full and mellow in flesh; chest full; loin broad; hips standing wide, and level with the chine; quarters long, and wide at the neck; rump even with the level of the back, and not drooping, nor standing high and sharp above the quarters; tail slender and neatly haired; barrel round and roomy; the carcass throughout deep and well spread; ribs broad, standing flat and close on the outer surface, forming a smooth, even barrel, the hindmost large and full of length; round bone small, snug, not prominent; thigh clean, and regularly tapering; legs upright and short; bone below the knee and hock small; feet of middle size; flank large; flesh everywhere mellow, soft, and yielding pleasantly to the touch, especially on the chine, the shoulder, and the ribs; hide mellow, supple, of a middle thickness, and loose on the neck and huckle; coat neatly haired, bright and silky; color, a middle red, with a bald face, characteristic of the true Hereford breed."

They fatten to a much greater weight than the Devons, and run from fifty to seventy score. (A tolerable cow will average from thirty-five to fifty score.) They are not now much used for husbandry, though their form adapts them for the heavier work; and they have all the honesty and docility of the Devon ox, and greater strength,

if not his activity. The Hereford ox fattens speedily at an early age, and it is more advantageous to the farmer, and perhaps to the country, that he should go to market a three years old, than to be kept longer to be employed as a beast of draught.

They are far worse milkers than the Devons. This is so generally aknowledged, that while there are many dairies of Devon cows in various parts of the country, (none of which, however, are very profitable to their owners,) a dairy of Herefords is rarely to be found.



HEREFORD WORKING OX.

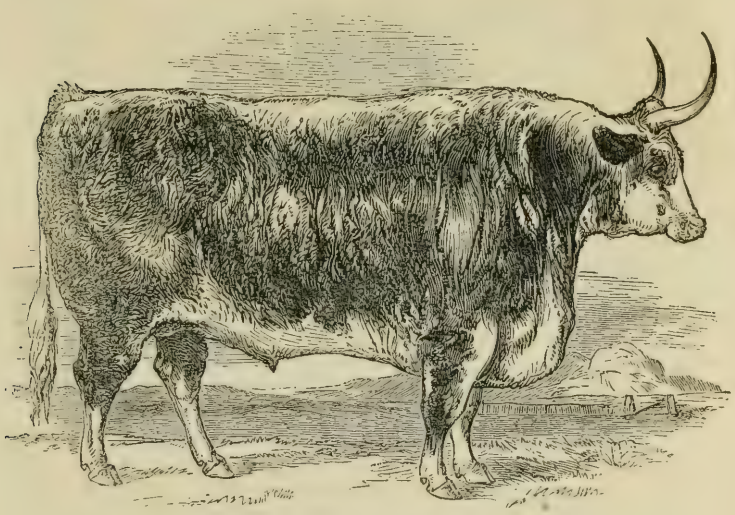
To compensate for this, they are kindly feeders. Their beef may be objected to by some as being occasionally a little too large in the bone, and the forequarters being coarse and heavy; but the meat of the best pieces is often very fine grained and beautifully marbled. There are few cattle more prized in the market than the genuine Herefords.

The Devons and the Herefords are both excellent breeds, and the prejudices of the Devonshire and Herefordshire farmers for their peculiar breed being set aside, a cross for the yoke or beef of the one will often materially improve the other. The Devon will acquire bulk, and the Hereford a finer form and activity.

The Herefords are evidently an aboriginal breed, and descended from the same stock as the Devons. If it were not for the white

face, and somewhat larger head and thicker neck, it would not at all times be easy to distinguish between a heavy Devon and a light Hereford. Their white faces may probably be traced to a cross with their not distant relations, the Montgomeries.

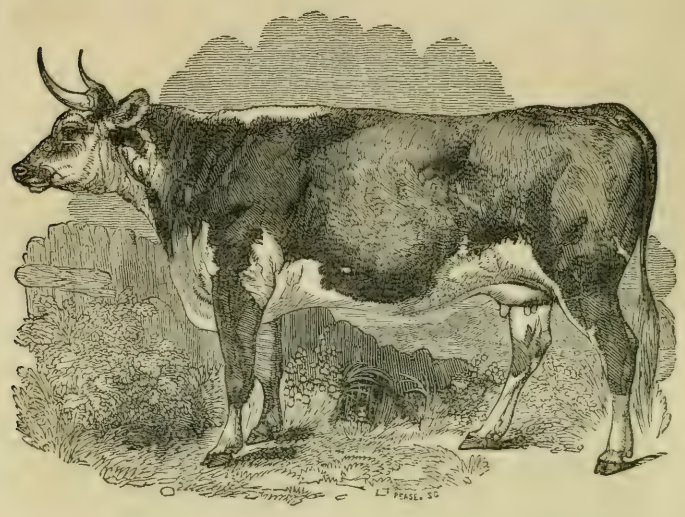
The Hereford cow is apparently a very inferior animal. Not only is she no milker, but even her form has been sacrificed by the breeder. Herefordshire is more a rearing than a feeding county, and therefore the farmer looks mostly to the shape and value of his young stock; and, in the choice of his cow, he does not value her, or select her, or breed from her according to her milking qualities, or the price which the grazier would give for her, but in proprotion as she possesses that general form which experience has taught him will render her likely to produce a good ox. Hence the Hereford cow is comparatively small and delicate, and some would call her ill-made. She is very light-fleshed when in common condition, and beyond that, while she is breeding, she is not suffered to proceed; but when she is actually put up for fattening, she spreads out, and accumulates fat at a most extraordinary rate.



HEREFORD FEEDING OX.

The breeder has been taught by experience, that when the cow, although she should be somewhat *roomy*, is too large and masculine, the ox will be brawny and coarse, and perhaps a little

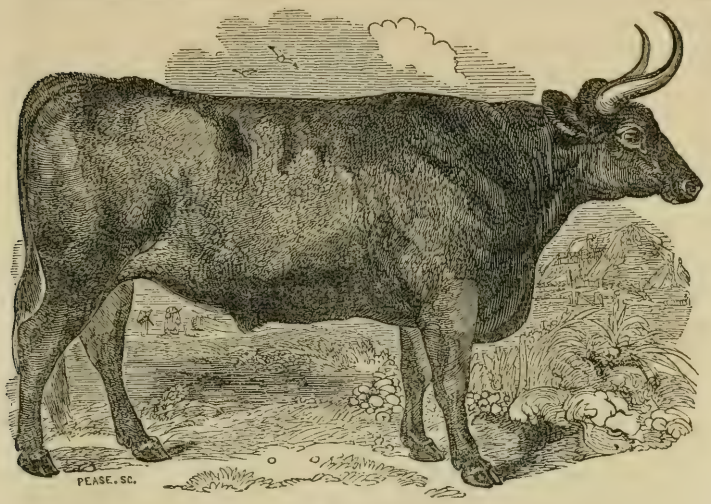
sluggish at work, and even somewhat unkind and slow in the process of fattening, and these are objections which, most of all, he would be unwilling to have justly made. The Hereford cow is therefore somewhat undersized; and it not unfrequently happens that she produces a bull-calf that grows to three times her own weight.



HEREFORD COW.

Kindly as the Hereford ox fattens, very few are grazed in their native country: even the beasts which the home consumption requires are principally heifers and old cows. The oxen are sold at five and six years old, in tolerable condition, at the Michaelmas fair in Hereford, to the graziers of Buckinghamshire and the neighborhoring counties, by whom they are principally preferred for the London market.

The fertility of the soil in Herefordshire has been very much overrated. The traveler, and the superficial observer have been misled by the luxuriant woods and rich alluvial soil upon the banks of its rivers. The pasture-grounds are generally poor, and the herbage is not nutritious, and therefore the farmer naturally confines his chief attention to his rearing-stock. The dairy has been comparatively neglected; for experience has proved that the breeding qualities of a cow are materially lessened, and even her form is deteriorated, by her being inclined to give a large quantity of milk.



THE SUSSEX OX.

THE SUSSEX CATTLE.

Some of the ancient Britons sought refuge from the attacks of their invaders, amid the fastnesses of the Weald of East Sussex. Thither they drove, or there they found, some of the native cattle of the country; and, they anxiously preserved them free from all admixture.

The resemblance between the Sussex and the Devon oxen is very great. They unquestionably betray the same origin.

The Sussex ox has a small and well formed head, compared with many other breeds, and even with the Hereford, but evidently coarser than that of the Devon; the horns pushing forward a little, and then turning upward, thin, tapering and long—not so as to confound this breed with the long horns. The eye is full, large and mild in the ox; but with some degree of unquietness in the cow. The throat clean, and the neck, compared with either the long horns or the short ones, long and thin, yet evidently coarser than that of the Devon.

At the shoulder is the main difference, and the principal defect in the Sussex cattle. There is more wideness and roundness on the withers—it is a straighter line from the summit of the withers toward the back—there is no projecting point of the shoulder when the animal is looked at from behind, but the whole of the fore-quarter is thickly covered with flesh, giving too much weight to the coarser and less profitable parts. This is counterbalanced by many admira-

ble points. If there is more weight in front, the fore legs are necessarily wider apart, straighter, and more perpendicular than in the Devon; they are placed more under the body rather than seeming to be attached to the sides. The fore-arm is large and muscular, but the legs, although coarser than those of the Devon, are small and fine downwards, and particularly below the fetlock. The barrel is round and deep—the back straight—no rising spinal processes are to be seen, but rather a central depression; and the line of the back, if broken, is only done so by a lump of fat rising between the hips. The belly and flank are capacious—there is room before for the heart and lungs to prepare and circulate the blood, and there is room behind, in the capacious belly, for the full development of all the organs of digestion; yet the beast is well ribbed home, the space between the last rib and the hip-bone is often very small, and there is no hanging heaviness of the belly or flank. The loins of the Sussex ox are wide; the hip-bone does not rise high, nor is it ragged externally; but it is large and spread out, and the space between the hips is well filled up.

The tail, which is fine and thin, is set on lower than in the Devon, yet the rump is nearly as straight, for the deficiency is supplied by a mass of flesh and fat swelling above. The hind quarters are cleanly made, and if the thighs appear to be straight without, there is plenty of fulness within.

The Sussex ox holds an intermediate place between the Devon and Hereford, with much of the activity of the first, and the strength of the second, and the propensity to fatten, and the beautiful, fine grained flesh of both. Experience has shown that it possesses as many of the good qualities of both as can be combined in one frame.

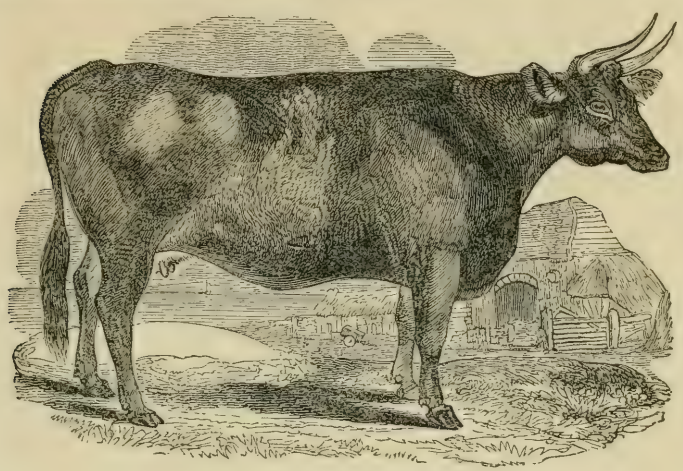
The Sussex ox is of a deep chestnut-red—some, however, prefer a blood-bay: deviation from this color indicates some stain in the breed.

The hide of the true Sussex is soft and mellow; a coarse, harsh, thick hide denotes here, as in every other district, an ill-bred or an unthrifty beast. The coat is short and sleek. There is seldom found on the Sussex ox that profusion of soft and wavy, and, occasionally, long hair, which, although it may have the appearance of roughness, is consistent with a mellow and yielding hide, and one of the truest indications of more than usual propensity to fatten.

The Sussex cow, like the Hereford one, is very inferior to the ox; she seems to be almost another kind of animal. The breeder has endeavored, but with comparatively little success, to give to the heifer the same points that the ox possesses.

The Sussex cow ought to have a deep red color, the hair fine, and the skin mellow, thin and soft; a small head, a fine horn, thin clean and transparent, which should run out horizontally, and afterwards

turn up at the tips; the neck very thin and clean made; a small leg; a straight top and bottom, with round and springing ribs; thick chine; loin, hips, and rump wide; shoulder flat—but the projection of the point of the shoulder is not liked, as the cattle subject to this defect are usually coarse; the legs should be rather short; carcass large; the tail should be level with the rump.



THE SUSSEX COW.

The Sussex cow does not answer for the dairy. Although her milk is of very good quality, it is so inferior in quantity to that of the Holderness or the Suffolk, that she is little regarded for the making of butter or cheese.

There is one great fault about the Sussex cows, seemingly inconsistent with their propensity to fatten, and which cannot be remedied. Their countenance indicates an unquiet temper; and they are often restless and dissatisfied, prowling about the hedge-rows, and endeavoring to break pasture, and especially if they are taken from the farm on which they were bred.

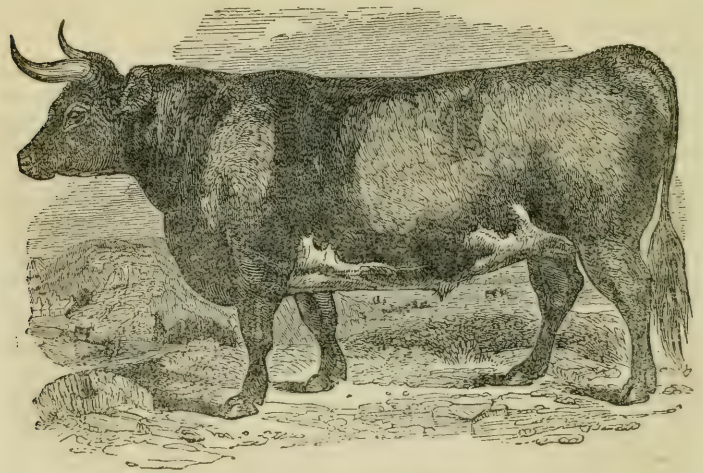
They are principally kept as breeders, all the use being made of them at the same time as dairy cows of which circumstances will admit. And it cannot be denied that they are generally in fair condition, even while they are milking; and that no beasts, except their kindred, the Devons and the Herefords, will thrive so speedily after they are dried. The secretion of milk being stopped, the Sussex cow will fatten even quicker than the ox. It must, however, be acknowledged that the Sussex cows are not perfect, even as breeders;

and that, unless a great deal of care is taken that the cow shall not be in too good condition at the time of calving, she is subject to puerperal fever, or "drooping;" while many a calf is lost from the too stimulating quality of her milk.

WALES.

To the Principality we naturally look for some trace of the native breed of cattle, for the Welsh were never entirely subdued by any of the early invaders. The Romans possessed merely a portion of that country; the Saxons scarcely penetrated at all into Wales, or not beyond the county of Monmouth; the Welsh long resisted the superior power of the English under the Norman kings; and it was not until late in the thirteenth century that the Principality was annexed to the crown of England. We therefore expect to find more decided specimens of the native productions of our island: nor are we altogether disappointed.

The principal and the most valuable portion of the cattle of Wales are the middle horns. They are, indeed, stunted in their growth, from the scanty food which their mountains yield, but they bear about them, in miniature, many of the points of the Devon, Sussex, and Hereford cattle.



THE PEMBROKE OX.

THE PEMBROKE CATTLE.

Great Britain does not afford a more useful animal than the Pembroke cow or ox. It is black; the great majority are entirely so; a few have white faces, or a little white about the tail, or the udders; and the horns are white. The latter turn up in a way characteristic of the breed, and indeed the general form of the cattle undeniably betrays their early origin. They have a peculiarly lively look and good eye. The hair is rough, but short, and the hide is not thick. The bones, although not small, are far from large; and the Pembroke cattle are very fair milkers, with a propensity to fatten. The meat is generally beautifully marbled. They thrive in every situation.

THE GLAMORGANS.

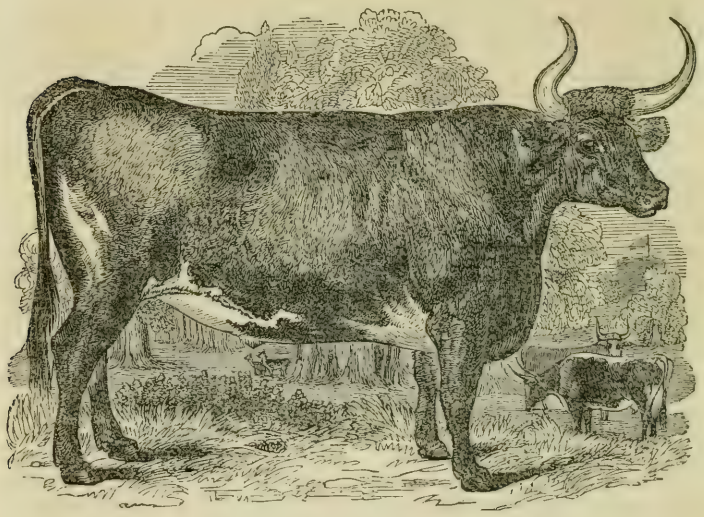
The Glamorganshire farmers, of half a century ago, took great pride in their cattle, and evinced much judgment in their breeding and selection. There was one principle from which they never deviated:—*they admitted of no mixture of foreign blood*, and they produced the Glamorgan ox, so much admired for activity and strength, and aptitude to fatten; and the cow, if she did not vie with the best milkers, yielded a good remunerating profit for the dairyman.

They were of a dark brown color, with white bellies, and a streak of white along the back from the shoulder to the tail. They had clean heads, tapering from the neck and shoulders; long white horns, turning upward; and a lively countenance. Their dewlaps were small, the hair short, and the coat silky. If there was any fault, it was that the rump, or setting on of the tail, was too high above the level of the back to accord with the modern notions of symmetry. Their aptitude to fatten rendered them exceedingly profitable when taken from the plough at six or seven years old, and they were brought to great perfection on the rich English pastures —frequently weighing more than twenty scores per quarter. The beef was beautifully veined and marbled, the inside of the animal was well lined with tallow, and the Glamorgans commanded the highest price both in the metropolitan and provincial market. Among the Glamorgan-vale browns good cow-beef weighed from eight to ten score pounds per quarter, although some weighed as much as twelve or thirteen scores. Ox-beef is from twelve to fourteen scores per quarter; some, however, reached eighteen and even twenty scores.

During the French revolutionary war, the excessive price of corn attracted the attention of the Glamorganshire farmers to the increased

cultivation of it, and a great proportion of the best pastures were turned over by the plough.

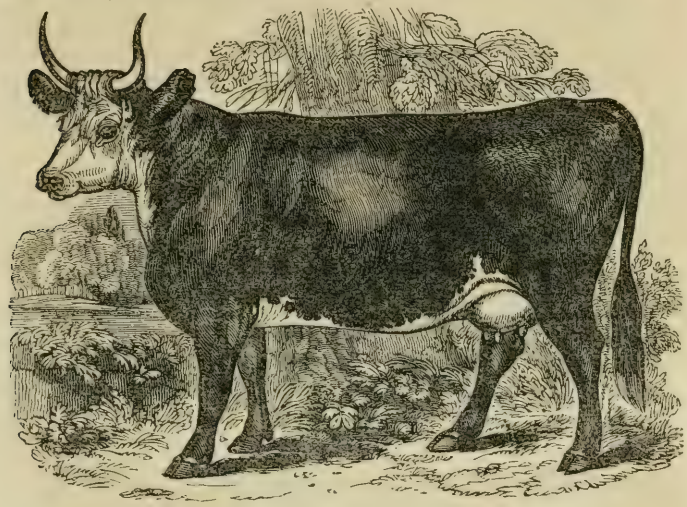
The natural consequence of inattention and starvation was, that the breed greatly degenerated in its disposition to fatten, and, certainly, with many exceptions, but yet, as their general character, the Glamorganshire cattle became and are flat-sided, sharp in the hip-joints and shoulders, high in the rump, too long in the legs, with thick skins, and a delicate constitution. Therefore, it must be acknowledged at present, and perhaps it must long continue to be the fact, that the Glamorgans, generally, are far from being what they once were. They continue, however, to maintain their character for stoutness and activity, and are still profitably employed in husbandry work. The beef is still good, marbled, and good tasted ; and in proportion as the value of the ox to the grazier has decreased, the value of the cow has become enhanced for the dairy. He who is accustomed to cattle will understand the meaning of this; and the kind of incompatibility between an aptitude to fatten in a little time, and on spare keep, and the property of yielding a more than average quantity of milk.



GLAMORGAN OX.

This is the breed which is established in the populous districts of Glamorgan. The Glamorgan cattle bear a close resemblance to the Herefords in figure, although inferior to them in size; they feed

kindly—the flesh and fat are laid equally over them—the beef is beautifully marbled, and they yield a more than average quantity of milk. They are fattened to perfection at five years old, but not often at an earlier age: and will become sufficiently bulky on the good pastures of the vale without any artificial food.



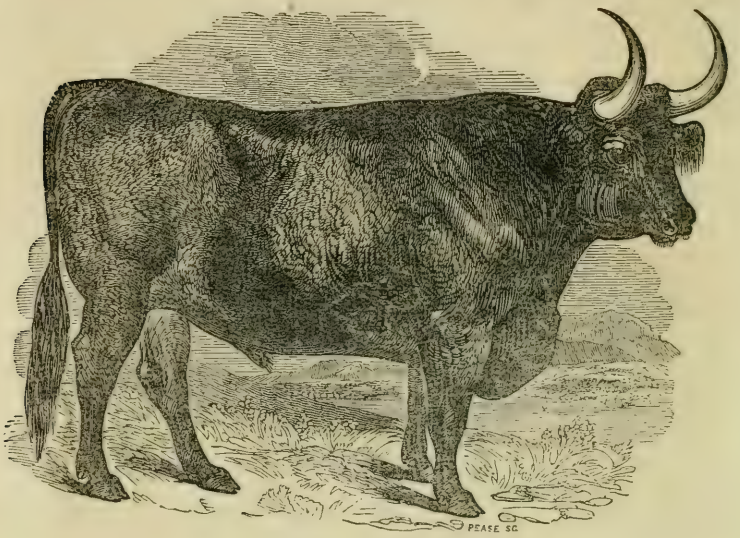
GLAMORGAN COW.

The cut is the portrait, and gives a faithful representation of the present improved breed of Glamorgan dairy-cattle. The average quantity of milk given by the cow is about sixteen quarts per day.

Although we place the cattle of North Wales as "middle-horns," we confess that we are a little approaching to the next division, "the long-horns." There is, however, a great deal of the character of "the middle-horns" about them, and marking their common origin.

THE ANGLESEY CATTLE.

The Anglesey cattle are small and black, with moderate bone, deep chest, rather too heavy shoulders, enormous dewlap, round barrel, high and spreading haunches, the face flat, the horns long, and, characteristic of the breed with which we will still venture to class them, almost invariably turning upward. The hair is apparently coarse, but the hide is mellow: they are hardy, easy to rear, and well-disposed to fatten when transplanted to better pasture than their native isle affords.



THE ANGLESEY OX.

The Angleysey cattle are principally destined for grazing. Great numbers of them are purchased in the midland counties, and prepared for metropolitan consumption; and not a few find their way directly to the vicinity of London, in order to be finished for the market. In point of size, they hold an intermediate rank between the English breeds of all kinds and the smaller varieties of Scotch cattle; and so they do in the facility with which they are brought into condition. If they are longer in preparing for the market, they pay more at last; and, like the Scots, they thrive where an English beast would starve.

SCOTLAND.

Scotland contains several distinct and valuable breeds of cattle, evidently belonging to our present division, "The Middle Horns."

The West Highlanders, whether we regard those that are found in the Hebrides, or the county of Argyle, seem to retain most of the aboriginal character. They have remained unchanged, or improved only by selection, for many generations; indeed from the earliest accounts that we possess of Scottish cattle.

The North Highlanders are a smaller, coarser, and in every way inferior race, and owe the greater part of what is valuable about them to crosses from the Western breed.

The North-Eastern Cattle were derived from, and bear a stong resemblance to, the West Highlander, but are of considerably larger size.

The Ayrshire Breed are second to none as milkers.

The Galloways, which scarcely a century ago were middle-horned, and with difficulty distinguished from the West Highlanders, are now a polled breed—increased in size, with more striking resemblance to their kindred, the Devons—with all their aptitude to fatten, and with a great hardiness of constitution.

THE WEST HIGHLAND CATTLE.

The cattle of the islands on the Western coast have the honor of being, or, at least, of retaining the character of the primitive breed, and whence are procured the purest and best specimens to preserve or to improve the Highland cattle in other districts.

Skirting the coast, from the promontory of Cantire to the northern extremity of Scotland, is a range of islands—the Hebrides, about half of them inhabited by man.

Little is known of the history of the Hebrideans, except that they descended from the same stock with the Irish and the Highlanders; and, at no very remote period, the inhabitants were singularly uncultivated, ignorant, idle, and miserable.

After the union between the English and Scottish kingdoms, and when civilization had commenced on the mainland, the Hebrideans began to be reclaimed, and that was chiefly manifested in, and promoted by, a change of occupation. Although they did not abandon their seafaring life, they began to be agriculturists. Their cattle, which had been totally neglected, and their value altogether unknown, retained their primitive character. The Hebrideans for the first time became aware of this, and they bred them in greater numbers, and a few of the most intelligent farmers endeavored to improve them by selections from the best specimens of their native stock; the result

has been, that the breeds of some of these islands now bear the highest price among the Highland cattle.

WEST HIGHLAND BULL OF THE ISLES.

In a group of islands, extending nearly two hundred miles from north to south, there will be considerable difference in the character and value of the breed; but through the whole of them the striking peculiarities of the Highland cattle are evident. The principal difference is in the size, and in that the cattle of the southernmost island, Islay, claim the superiority. This island is sheltered by its situation from the storms to which most of the others are exposed, and the pasturage is better; the cattle are earlier ready for the market, and attain a greater weight. This increase of size would not be of advantage on the northern islands, or even on the mainland—the cattle, deprived of a portion of their hardihood, would not be proof against the inclemency of the weather, and would starve on such scanty forage as the Highlands in general supply. Breeders are so much aware of this, that they endeavor to preserve the purity and value of their stock, by selecting, not from the districts where the size has increased, but, by almost general consent, from the Isle of Skye, where the cattle are small, *but are suited to the soil and to the climate; and can be most easily and securely raised at the least expense; and, when removed to better provender, will thrive with a rapidity almost incredible.*

The origin of the term Kyloe is obscure, but is said to be a cor-

ruption of the Gaelic word which signifies *highland*, and is pronounced as if spelled Kaêl.

The Highland bull, or kyloe, should be black, or pale red, the head small, the ears thin, the muzzle fine, and rather turned up. He should be broad in the face, the eyes prominent, and the countenance calm and placid. The horns should taper finely to a point; and, neither drooping too much, nor rising too high, should be of a waxy color, and widely set on at the root. The neck should be fine, particularly where it joins the head, and rising with a gentle curve from the shoulder. The breast wide, and projecting well before the legs. The shoulders broad at the top, and the chine so full as to leave but little hollow behind them. The girth behind the shoulder deep; the back straight, wide, and flat; the ribs broad, the space between them and the hips small; the belly not sinking low in the middle; yet, on the whole, not forming a round and barrel-like carcass. The thigh tapering to the hock-joint; the bones larger in proportion to the size than in the breeds of the southern districts. The tail set on a level with the back. The legs short and straight. The whole carcass covered with a thick, long coat of hair, and plenty of hair also about the face and horns, and that hair not curly.

The value of the West Highland cattle consists in their being hardy, and easily fed; in that they will live, and sometimes thrive, on the coarsest pastures; that they will frequently gain from a fourth to a third of their original weight in six months' good feeding; that the proportion of offal is not greater than in the most improved larger breeds; that they will lay their flesh and fat equably on the best parts; and that, when fat, the beef is close and fine in the grain, highly flavored, and so well mixed or marbled, that it commands a superior price in every market.

Forty years ago, the treatment of cattle was, with very few exceptions, absurd and ruinous, to a strange degree, through the whole of the Hebrides. With the exception of the milch cows, but not even of the calves, they were all wintered in the field: if they were scantily fed with hay, it was coarse, and withered, and half-rotten; or if they got a little straw, they were thought to be well taken care of. The majority got little more than sea-weed, heather, and rushes. One-fifth of the cattle, on an average, used to perish every winter from starvation. When the cold had been unusually severe, and the snow had lain long on the ground, one-half of the stock has been lost, and the remainder have afterward been thinned by the diseases which poverty had engendered.

It proved the excellency of the breed, that, in the course of two or three months, so many of them got again into good store-condition, and might almost be said to be half-fat, and could scarcely be restrained by any fence: in fact, there are numerous instances of these cattle, which had been reduced to the most dreadful state of

impoverishment, becoming fattened for the butcher in a few months, after being placed on some of the rich summer pastures of Islay, Lewis, or Skye.

The cows were housed during the winter; the litter was never removed from them, but fresh layers of straw were occasionally laid down, and so the floor rose with the accumulation of dung and litter, until the season of spreading it upon the land, when it was taken away.

The peculiarity of the climate, and the want of inclosed lands, and the want, too, of forethought in the farmer, were the chief causes of this wretched system of winter starvation. The rapidity of vegetation in the latter part of the spring is astonishing in these islands. A good pasture can scarcely be left a fortnight without growing high and rank; and even the unenclosed, and marshy, and heathy grounds, are comparatively luxuriant. In consequence of this, the farmer fully stocked, or overstocked, even this pasture. He crowded his fields at the rate of six or eight beasts, or more, to an acre. From their natural aptitude to fatten, they got into tolerable condition, but not such as they might have attained. Winter, however, succeeded to summer: no provision had been made for it, except for the cows; and the beasts that were not properly fed even in the summer, languished and starved in the winter.

The Hebrides, however, have partaken of that improvement in agriculture of which we shall have frequently to speak when describing the different districts of Scotland. In the island of Islay, the following is the general system of management among the better kind of farmers, and the account will apply to the Hebrides generally, and to Argyleshire.

The calves generally are dropped from the 1st of February to the middle of April. All are reared; and for three or four months are allowed to suck three times in the day, but are not permitted to draw any great quantity at a time. In summer, all the cattle are pastured; the calves are sent to their dams twice a day, and the *strippings*, or last part of the milk, is taken away by the dairy-maid. The calves are separated from their dams two or three weeks before the cast-cows are sent to the cattle-tryst at the end of October, the greater part of them being driven as far as the Lowland districts, whence they gradually find their way to the central and southern counties of England.

The calves are housed in the beginning of November, and are highly fed on hay and roots (for the raising of which the soil and climate are admirably adapted) until the month of May. When there is plenty of keep, the breeding cows are housed in November, but in general they are kept out until three or four weeks before calving. In May the whole cattle are turned out to pasture, and, if it is practicable, those of different ages are kept separate; while, by

shifting the cattle, the pasture is kept as much as possible in eatable condition, that is, neither eaten too bare, nor allowed to get too rank, or to run into seed.

In the winter and the spring all the cattle except the breeding cows are fed in the fields; the grass of which is preserved from the 12th of August to the end of October. When these inclosures become bare, about the end of December, a little hay is taken into the field, with turnips or potatoes, once or twice in the day, according to circumstances, until the middle or end of April. Few of the farmers have these roots to give them, and the feeding of the out-lying cattle with straw is quite abolished. If any of them, however, are very materially out of condition, they are fed with oats in the sheaf. At two, or three, or four years old, all except the heifers retained for breeding are sent to market.

There is no variety of breeds of cattle in the Hebrides. They are pure West Highlanders. Indeed, it is the belief of the Hebridean farmer, that no other cattle will thrive on these islands, and that the Kyloes could not possibly be improved by being crossed with any others. He appeals to his uniform experience, and most correctly so in the Hebrides, that attempts at crossing have only destroyed the symmetry of the Kyloes, and rendered them more delicate, and less suitable to the climate and the pasture.

By selection from the choicest of the stock, the West Highlander has been materially improved. The Islay, the Isle of Skye, and the Argyleshire beast, readily obtains a considerably higher price than any other cattle reared in the Highlands of Scotland. Mr. M'Neil has been eminently successful in his attempts to improve the native breed. He has often obtained £100 for three and four-year-old bulls out of his stock; and for one bull he received £200. He never breeds from bulls less than three years, or more than ten years old; and he disapproves, and rightly in such a climate, of the system of breeding in and in. He also adheres to that golden rule of breeding, the careful selection of the female; and, indeed, it is not a small sum that would induce the Hebridean farmer to part with any of his picked cows.

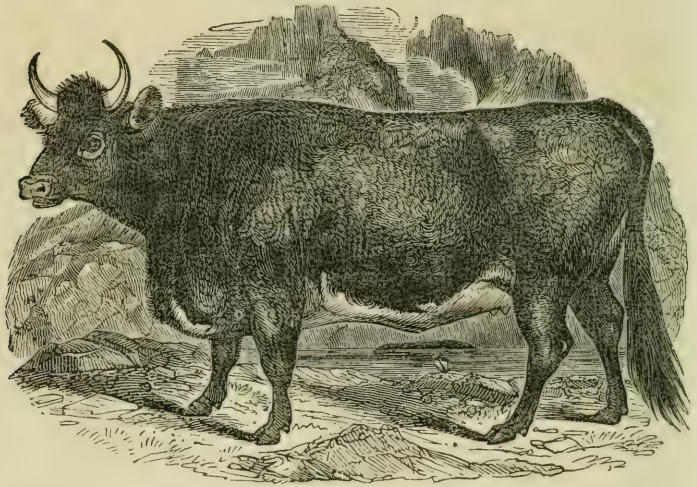
It is true that grazing has never been the principal object of the Hebridean farmer, or has scarcely been deemed worthy of his attention.

It will be concluded from what we have said of the milking properties of the Kyloe, that the dairy is considered as a matter of little consequence in the Hebrides; and the farmer rarely keeps more milch cows than will furnish his family with milk and butter and cheese. The Highland cow will not yield more than a third part of the milk that is obtained from the Ayrshire one at no great distance on the main land; but that milk is exceedingly rich, and the butter procured from it is excellent.

Oxen are never used for the plough, or on the road, on any of the Hebrides.

We have stated that more than 20,000 of the Hebridean cattle are conveyed to the mainland, some of which find their way even to the southernmost counties of England; but, like the other Highland cattle, their journey is usually slow and interrupted. Their first resting-place is not a great way from the coast, for they are frequently wintered on the coarse pastures of Dumbartonshire; and in the next summer, after grazing awhile on the lower grounds, they are driven farther south, where they are fed during the second winter on turnips and hay. In April they are in good condition, and prepared for the early grass, on which they are finished.

Many of these small cattle are permanently arrested in their journey, and kept on low farms to consume the coarse grass, which other breeds refuse to eat; these are finished off on turnips, which are given them in the field about the end of autumn, and they are sold about Christmas.



THE WEST HIGHLAND COW.

In the Outer Hebrides the black cattle are small but well proportioned, and on the tackmen's farms they are generally of good breed, and, although not heavy, very handsome. They are covered with a thick and long pile during the winter and spring; and a good pile is considered one of the essential qualifications of a cow. The most common colors are black, red, brown, or *brandered*, (that is, a mixture of red and brown in stripes—*brindled*.) A whitish dun color is also pretty frequently seen. The breed of

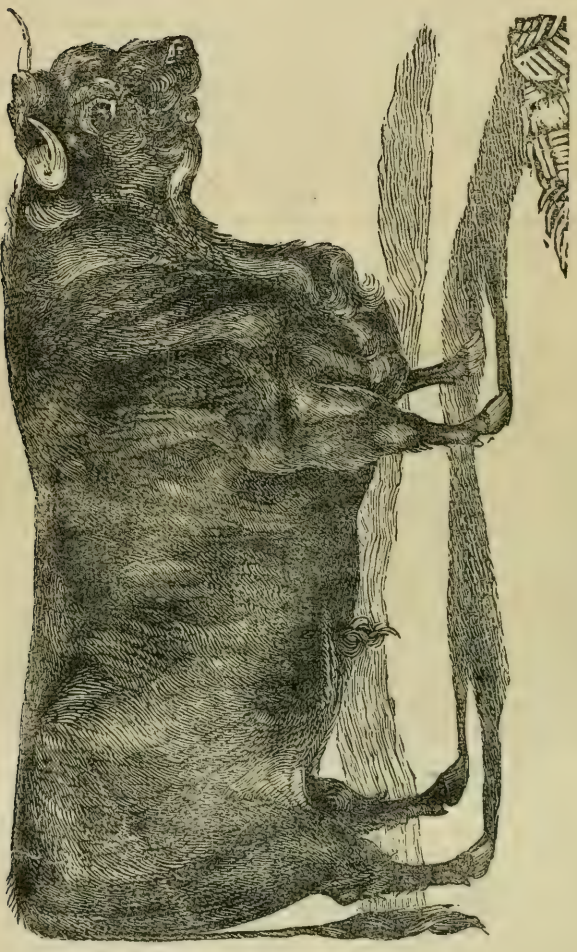
black cattle has been greatly improved of late years, by the importation of bulls and cows from various parts of the Highlands.

WEST HIGHLANDERS IN ARGYLESHIRE.

The county of Argyle stretches along the western coast of Scotland for 115 miles, but its average breadth is little more than 30 miles. The southern part is low, and comparatively level, and the temperature mild. The northern is rugged and mountainous, and the climate cold and ungenial, and there is much barren land, and little good pasture; but in Cantire, at the south, there is plenty of excellent feed; therefore the cattle differ materially in the northern and southern parts. Among the mountains, the Highland breed is found almost unmixed; in the level country, there is the same variety and mixture of breed which is observed in other dairy districts.

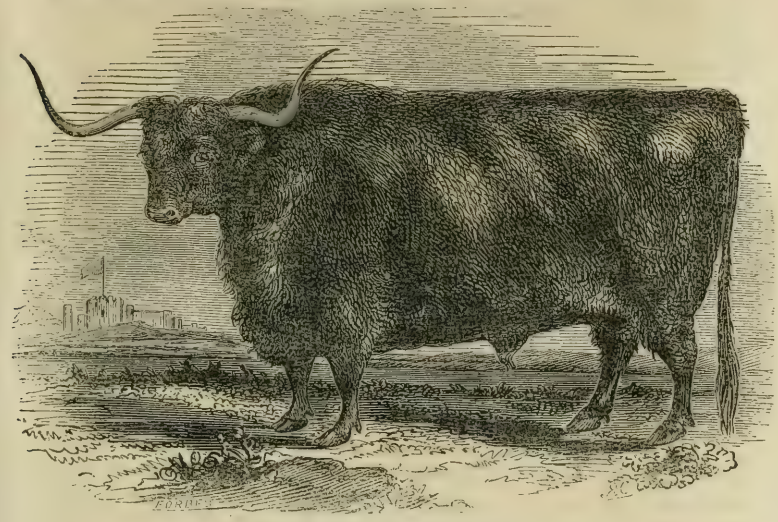
In North Argyle the West Highlanders are larger than the Hebrideans, and are now bred to the full size which the soil, or the best qualities of the animal, will bear. That fundamental principle of breeding is generally adopted here, that the size must be determined by the soil and the food; and that it is far more profitable to the farmer to have the size of his breed under, than over, the produce of his land. Both will gradually adapt themselves to the soil; but the small beast will become more bulky, and improve in all his points—the large one will degenerate in form and in every good quality. Therefore, the soil and management of Argyle being, generally speaking, better than that of the Hebrides, it was found that a somewhat larger animal might be admitted; he was, however, procured, not by crossing with a breed of superior size, but by careful selection from the best of the pure breed. Experience and judgment soon discovered when the proper point—the profitable weight—was gained; and then the farmer went back to the equally pure but smaller breed of Skye, lest the form should be deteriorated, and the fattening should not be so equable and true, and the meat should lose some of its beautiful character and flavor.

There is no part of the Highlands where the soil and the climate are better adapted to the perfection of the breed than in Argyle, or where we oftener see the true characteristics of the best Highland cattle—short and somewhat strong in the shank, round in the body, straight in the back, well-haired, long in the muzzle, and with a well-turned and rather small horn. There is no district in which the farmer so superstitiously, and yet properly, refrains from foreign admixture. Could the two great errors of the Highland farmer be remedied, namely, overstocking in summer and starving in winter—there would be nothing more to desire for the grazier, except, per-



WEST HIGHLAND BULL OF ARGYLSHIRE.

haps, docility of temper; and that will be acquired when improvements in agriculture have rendered it unnecessary for the beast to wander so far over so wild a country, in search of food, and when he will be earlier and more perfectly domesticated. The Highlander, however, must be reared for the grazier alone. Every attention to increase his weight, in order to make him capable of agricultural labor—every effort to qualify him for the dairy, will not only lessen his hardiness of constitution and propensity to fatten, but will fail in rendering him valuable for the purpose at which the farmer foolishly aims. The character of the Highlander must still be, that he will pay better for his quantity of food than any other breed, and will fatten where any other breed would only live. This is the secret of profitably breeding or grazing the Highland cattle.



THE WEST HIGHLAND FAT OX.

The management both of the cow and her calf depend much on the object which the breeder principally pursues. If he studies the character of his stock, he makes little butter and cheese, and generally rears a calf for every cow, giving it the greater part of her milk. A likely bull-calf is sometimes allowed the milk of two cows for a considerable time, and often for six months. When the calves are weaned, they are fed on the hills during the summer, and brought on the lower grounds in winter; and, if the pasture is not good, they are occasionally fed with straw and hay. It is after the first winter that the absurd and cruel system of overstocking and starvation com-

mences. From the superiority of the soil, however, this is not carried to the ruinous extent here that it is in the Hebrides. In favorable situations, some farmers winter their calves in open sheds, where they are fed with hay in the racks. This makes them hardier, and does not cripple their growth.

WEST HIGHLAND FEEDING OX.

The Argyleshire farmer is sometimes wrong in breeding from a favorite cow too long. Although the Highlanders fatten rapidly for a certain time, and begin early to fatten where the pasturage will give them opportunity, they do not thrive so well when old. A cow, ultimately destined for the drover, should not be permitted to breed after six years old. She may make fair meat for home consumption, but she will not fatten so quickly, or so truly, on all her points; and the drover will seldom purchase her except at a very inferior price.

It is now also established as a principle, that the same bull should not be used too long. The hardiness of the cattle has been thought to be materially affected by it. The bulls are generally disposed of at six years old, when they are in full vigor, and valuable for some distant herd.

The Ayrshire cow has, however, nearly superseded the native breed through the whole of Argyleshire for the purposes of the dairy. She is promising to spread as rapidly and as widely through the middle and northern parts of Scotland as the short-horn has done

along the whole of the eastern part of England. The West Highland cattle are universally adopted for grazing farms, and the Ayrshire nearly as generally for the dairy. Some Galloways are found in Argyle, and particularly in the southern part of the county: but they are not equal to the native Highlanders.

THE SHETLAND ISLANDS.

SHETLAND BULL, OR WEST HIGHLANDER OF THE SHETLAND ISLES.

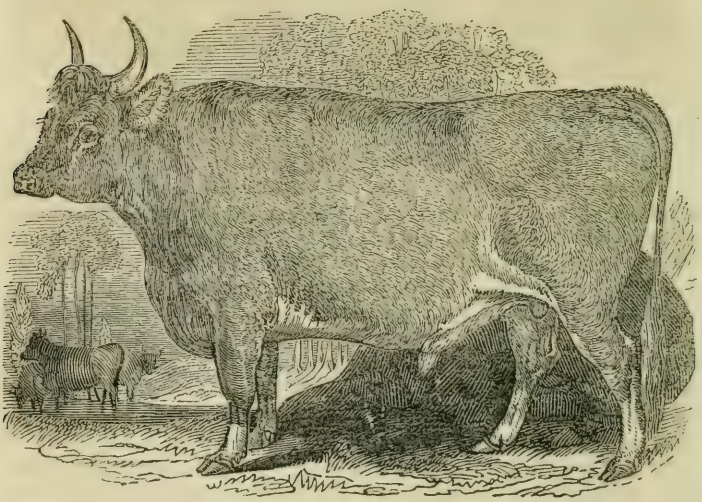
The Shetland islands present a wonderful scene of rugged, black, and barren rocks. No tree or shrub relieves these dreary scenes, and only gray rocks appear rising from the marshes, and pools, and shores, bounded by the wildest precipices. There are few or no artificial grasses, or green crops, or enclosures protecting these crops, and grasses could not be brought to perfection in these islands: there is nothing but moss, heath, and sea-weed; yet there is a breed of horses, diminutive, but beautiful, hardy, and strong; and the cattle are of the same origin with the West Highlanders. They have been diminished in size by the coldness of the climate and the scarcity of food; but they have not been so seriously injured by the folly of men—they have not been domesticated to be starved outright. They are small, gaunt, ill-shaped, so far, indeed, as their shape can be ascertained through the long, thick hair with which they are covered, and which forms an impenetrable defence against the snow and the

sleet. They are rarely more than four feet high at the withers, and sometimes scarcely more than thirty-five or forty pounds a quarter.

The Shetland cattle contrive to live on their native moors and wastes, and some of them fatten there; for a considerable and increasing quantity of beef is salted in Shetland and sent to the mainland, the quality of which is exceedingly good. When, however, the Shetlanders are transported to the comparatively richer pastures of the north of Scotland, they thrive with almost incredible rapidity, and their flesh and fat, being so newly and quickly laid on, is said to be peculiarly delicious and tender. They run to fifteen or sixteen, or even twenty stones in weight. If they are carried still farther south they rarely thrive; they become sickly, and even poor, in the midst of abundance: the change is too great, and the constitution cannot become habituated to it.

ABERDEENSHIRE.

This extensive county breeds or grazes more cattle than any other of Scotland. The cattle in Aberdeenshire have been calculated at 110,000. More than 20,000 are slaughtered, or sold to the graziers, every year.

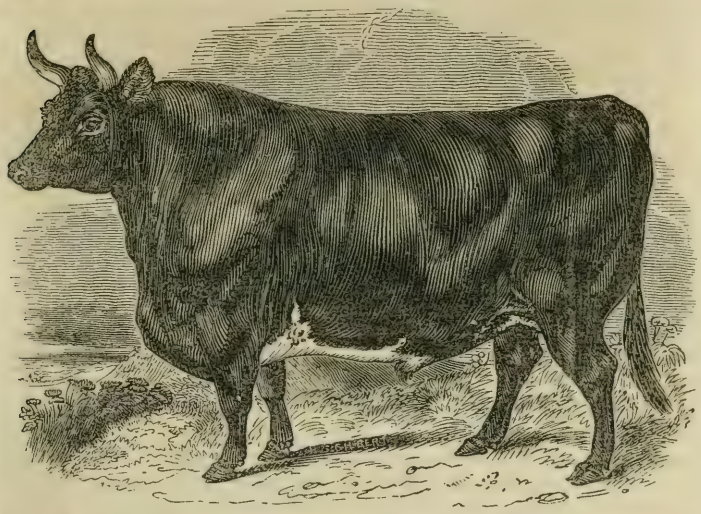


ABERDEENSHIRE OX.

The character of the cattle varies with that of the country. In the interior, and on the hills, formerly occupying the whole of that district, and still existing in considerable numbers, is the native unmixed Highland breed. This breed, however, would be out of its place in the milder climate and more productive soil of the lower district of Aberdeen; another kind of cattle was therefore gradually raised, the origin of which it is difficult to describe.

It was first attempted by judicious selections from the native breed, and some increase of size was obtained, but not sufficient for the pasture. The long-horn and the short-horn were tried; but either they did not amalgamate with the native breed, or a species of cattle were produced too large for the soil. There were exceptions to this, and one of them, the Kintore ox, we give in two stages of his preparation for market.

He was bred bred by Lord Kintore from an Aberdeenshire cow and a short-horn bull.

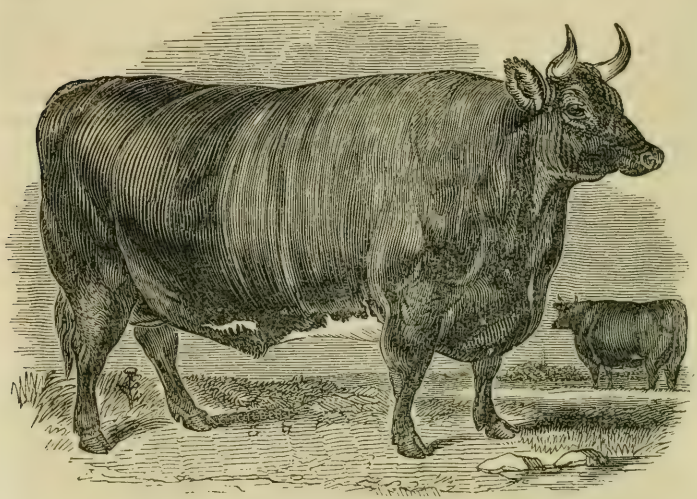


KINTORE OX, FEEDING.

This animal was a sufficient proof of what may be effected by the cross. The introduction of steam will probably tempt many of the northern breeders to try this first cross.

To improve the Aberdeen cattle, all the southern counties of Scotland were resorted to, but with doubtful success. The Fife, or Falkland breed, possessed enough of the old cattle to bid fair to mingle and be identified with the natives, while the bones were smaller, the limbs cleaner, and yet short; the carcass fairly round, and the hips wide, and they were superior in size, hardy, and docile,

and excellent at work, and good milkers. These were desirable qualities, and particularly as mingling with the Highland breed. Accordingly, bulls from Fife were introduced into Aberdeen, and the progeny so answered as to be generally adopted, and become the foundation of what is now regarded as the Aberdeenshire native breed.



KINTORE OX, FATTED.

The horns do not taper so finely, nor stand so much upward as in the West Highlanders, and they are also whiter; the hair is shorter and thinner; the ribs cannot be said to be flat, but the chest is deeper in proportion to the circumference; and the buttock and thighs are likewise thinner. The color is usually black, but sometimes brindled: they are heavier in carcass; they give a larger quantity of milk; but they do not attain maturity so early as the West Highlanders, nor is their flesh quite so beautifully marbled: yet, at a proper age, they fatten as readily as the others, not only on good pasture, but on that which is somewhat inferior.

AYRSHIRE BREED.

This county extends along the eastern coast of the Firth of Clyde, and the North Channel from Renfrew to Wigtownshire, by the former of which it is bordered on the north, and by the latter on the south, while it has Kircudbright, Dumfries, and Lanark on the east. The climate is moist, but mild; and the soil, with its produce, is calculated to render it the finest dairy county in Scotland, and equal, perhaps, to any in Great Britain. There is a great deal of permanent pasture on the sides and tops of the hills; but the greater part of the arable land is pasture and crop alternately. The pasture-ground is occupied by the beautiful dairy stock, a very small portion of it being reserved for the fattening of cows too old to milk.

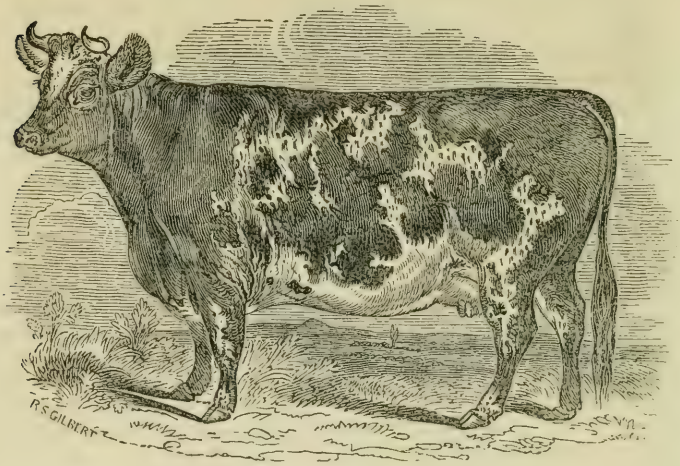
Ayrshire is divided into three districts;—south of the river Doon is the Bailiary of *Carrick*—between the Doon and the Irvine is the Bailiary of *Kyle*, and north of the Irvine is *Cunningham*. This last division lays principal claim to be the native country of the Ayrshire cattle, and, indeed, they once went by the name of the Cunningham cattle.

Mr. Aiton, in his "Treatise on the Dairy Breed of Cows," thus describes the Ayrshire cattle;—"The *shapes* most approved of, are—*head* small, but rather long and narrow at the muzzle; the *eye* small, but smart and lively; the *horns* small, clear, crooked, and their roots at considerable distance from each other; *neck* long and slender, tapering toward the head, with no loose skin below; *shoulders* thin; *fore-quarters* light; *hind-quarters* large; *back* straight, broad behind, the joints rather loose and open; *carcass* deep, and *pelvis* capacious, and wide over the *hips*, with round fleshy *buttocks; tail* long and small; *legs* small and short, with firm *joints; udder* capacious, broad, and square, stretching forward, and neither fleshy, low hung, nor loose; the *milk veins* large and prominent; *teats* short, all pointing outward, and at considerable distance from each other; *skin* thin and loose; *hair* soft and wooly. The *head*, *bones*, *horns*, and all parts of *least value*, small; and the general *figure* compact and well proportioned." Mr. Rankine very properly remarks, that, "compared with other improved breeds, the thighs, or what is called the twist of the Ayrshire cow, are *thin*. She is, characteristically, not a *fleshy* animal."

The Ayrshire farmers prefer their dairy-bulls, according to the feminine aspect of their heads and necks; and wish them not round behind, but broad at the hook-bones and hips, and full in the flanks. Experience, dearly bought, led to this, for the consequence of the crossing of the small native breeds with the heavy cattle imported from the south, was a bony, ill-shaped animal, not much improved as a milker, and its disposition to fat lamentably decreased; it may, however, demand consideration whether the round and compact form

of the West Highlander and the Galloway have not been too much sacrificed, and even the defects of the short-horn needlessly perpetuated.

Mr. Aiton says:—"The *qualities* of a cow are of great importance. Tameness and docility of temper greatly enhance the value of a milch cow. Some degree of hardiness, a sound constitution, and a moderate degree of life and spirits, are qualities to be wished for in a dairy cow, and what those of Ayrshire generally possess. The most valuable quality which a dairy cow can possess is, that she yields much milk, and that of an oily, or butyraceous, or caseous nature, and that after she has yielded very large quantities of milk for several years, she shall be as valuable for beef as any other breed of cows known; her fat shall be much more mixed through the whole flesh, and she shall fatten faster than any other." This is high praise, if it can be truly affirmed of the Ayrshire cattle; we are naturally anxious to know the origin, the history, and the general management of this valuable animal.



AYRSHIRE COW.

The origin of the Ayrshire cow is even at the present day a matter of dispute; all that is certainly known is, that a century ago there was no such breed in Cunningham, or Ayrshire, or Scotland. Did the Ayrshire cattle arise entirely from a careful selection of the best of the native breed?—if they did, it is a circumstance unparalleled in the history of agriculture. The native breed may be ameliorated by careful selection; its value may be incalculably increased—some good qualities—some of its best qualities—may be for the first time

developed; but yet there will be some resemblance to the original stock, and the more we examine the animal, the more clearly we can trace out the characteristic points of the ancestor, although every one of them improved.

THE AYRSHIRE BULL.

Mr. Aiton gives the following description of the Ayrshire cattle seventy years ago:—"The cows kept in the districts of Kyle and Cunningham were of a diminutive size, ill-fed, ill-shaped, and they yielded but a scanty return in milk; they were mostly of a black color, with large stripes of white along the chine or ridge of their backs, about the flanks, and on their faces. Their horns were high and crooked, having deep ringlets at the root, the plainest proof that the cattle were but scantily fed; the chine of their backs stood up high and narrow: their sides were lank, short and thin; their hides thick, and adhering to the bones; their pile was coarse and open; and few of them yielded more than six or eight quarts of milk per day, when in their best plight; or weighed, when fat, more than from twelve or sixteen to twenty stones avoirdupois, sinking offal." It was impossible that these cattle, fed as they then were, could be of great weight, well shaped, or yield much milk. Their only food in winter and spring was oat-straw, and what they could pick up in the fields to which they were turned out almost every day, with a mash of a little corn with chaff daily for a few weeks after calving, and their pasture in summer was of the very worst quality; and that coarse

pasture was so overstocked, and eaten so bare, that the cattle were half-starved.

If Mr. Aiton's description of the present improved Ayrshire is correct, the breed is very much changed, and yet there is so much indistinct resemblance, that a great deal of it must have been done by careful selection, from among the native cattle, and better feeding and treatment; but when we look closer into the matter, the shortness, or rather diminutiveness of the horns, their width of base, and awkward setting on; the peculiar tapering towards the muzzle; the narrowing at the girth; the bellying; and the prominences of all the bones—these are features which it is impossible for any selection from the native breed to give. While the judge of cattle will trace the features of the old breed, he will suspect, what general tradition confirms, that it was a fortunate cross, or a succession of crosses with some foreign stock, and that, probably, it was the Teeswater shorthorn that helped to produce the improved Cunningham cattle.

In many other districts of Scotland the attempt to introduce the Teeswater breed, or to establish a cross from it, had palpably failed, for the soil and the climate suited only the hardihood of the Highlander; but here in Ayrshire was a mild climate—a dairy country; the Highlander was in a manner out of his place; he had degenerated, and the milking properties of the Teeswater and her capability of ultimately fattening, amalgamated with his hardihood and disposition to fatten, and there resulted a breed, bearing the stamp of its progenitors, and, to a very considerable degree, the good qualities of both.

Who introduced the present breed is not very precisely ascertained; but the late Colonel Fullarton, in his account of "*The Husbandry of Ayrshire*," which was published in 1793, and whose authority is of considerable weight in everything relating to it, states, that a gentleman of long experience, Mr. Bruce Campbell, asserts that this breed was introduced by the late Earl of Marchmont. The introduction, then, of this dairy-stock must have happened between 1724 to 1740, and so far corresponds with the traditionary account. From what particular part of the country they came there appears no evidence. The conjecture is, that they are either of the Teeswater breed, or derived from it; judging from the varied color, or, from somewhat better evidence, the small head and slender neck, in which they bear a striking resemblance to them. Some breeders, however, have maintained that they were produced from the native cow, crossed by the Alderney bull. It requires but one moment's inspection of the animals, to convince us that this supposition is altogether erroneous.

These catttle, from which, by crosses with the native breed, the present improved Ayrshire arose, were first introduced on Lord Marchmont's estates in Berwickshire, and at Sornbergh in Kyle. A

bull of the new stock was sold to Mr. Hamilton of Sundrum; then Mr. Dunlop in Cunningham imported some of the short-horns, and their progeny was long afterwards distinguished by the name of the Dunlop cows. These were the first of the improved breed that reached the bailliery of Cunningham. Mr. Orr, about the year 1767, brought to Kilmarnock some fine milch cows, of a larger size than any which had been seen there. It was not, however, until about 1780 that this improved breed might be said to be duly estimated, or generally established in that part of Ayrshire; about 1790, Mr. Fulton from Blith carried them first into Carrick, and Mr. Wilson of Kilpatrick first took them to the southern parts of that district. So late as 1804 they were introduced on the estate of Penmore, and they are now the established cattle of Ayrshire: they are increasing in the neighboring counties, and have found their way to most parts of Britain.

The breed has much improved since Mr. Aiton described it, and is short in the leg, the neck a little thicker at the shoulder, but finely shaped toward the head; the horns smaller than those of the Highlander, but clear and smooth, pointing forward, turning upward, and tapering to a point. They are deep in the carcass, but not round and ample, and especially not so in the loins and haunches. Some, however, have suspected, and not without reason, that an attention to the shape and beauty, and an attempt to produce fat and sleeky cattle, which may be admired at the show, has a tendency to improve what is only their quality as grazing cattle—and that at the certainty of diminishing their value as milkers,

The excellency of a dairy cow is estimated by the quantity and the quality of her milk. The quantity yielded by the Ayrshire cow is, considering her size, very great. Five gallons daily, for two or three months after calving, may be considered as not more than an average quantity. Three gallons daily will be given for the next three months, and one gallon and a half during the succeeding four months. This would amount to more than 850 gallons; but allowing for some unproductive cows, 600 gallons per year may be the average quantity annually from each cow.

The disposal of the milk varies according to the situation of the farm and the character of the neigborhood. If it is sold as new milk, the produce of the cow will be £20 per annum. Others at a distance from any considerable town, convert it into butter or cheese.

The quality of the milk is estimated by the quantity of butter or cheese that it will yield. Three gallons and a half of this milk will yield about a pound and a half of butter. An Ayrshire cow, therefore, may be reckoned to yield 257 pounds of butter per annum.

When the calculation is formed, according to the quantity of cheese that is usually produced, the following will be the result:—twenty-

eight gallons of milk, with the cream, will yield 24 pounds of sweet-milk cheese, or 514 pounds per annum.

This is certainly an extraordinary quantity of butter and cheese, and fully establishes the reputation of the Ayrshire cow, so far as the dairy is concerned.*

Mr. Aiton rates the profit of the Ayrshire cow at a higher value. He says, "To sum up all in one sentence, I now repeat that thousands of the best Scotch dairy cows, when they are in their best condition and well fed, yield at the rate of 1000 gallons in one year; that, in general, from $3\frac{3}{4}$ to 4 gallons of their milk will yield a pound and a half of butter; that $27\frac{1}{2}$ gallons of their milk will produce 21 pounds weight of full milk-cheese."

Mr. Rankine very justly maintains that Mr. Aiton's statement is far too high, and his calculations not well founded. "He deduces his statement," says Mr. Rankine, "from the circumstance of some farmers letting the milk of their cows for a year at £15 and £17, which, taking 30 gallons to produce 24 lbs. of cheese, and the price being 10s., would require 1,080 gallons for each cow. But he is not warranted in inferring that the milk from which these rents were paid was all converted into cheese. No such rents were ever paid for cows where a considerable portion of the milk was made into cheese. In the vicinity of a town where the whole of the milk could be sold for 8d. a gallon, 450 gallons would bring £15. Where the whole of the milk could have been turned to such an account, such rents might have been paid; but it is erroneous to calculate the quantity of milk given from the quantity of cheese required to enable a rent of £15 to be paid. His first statement that 600 gallons are yielded, though far above the average of all the cows in the county, may be too low when applied to the best selected stocks on good land;—but I have reason to believe that no stock of 20 cows ever averaged 850 gallons each in the year. I have seen 9 gallons of milk drawn from a cow in one day. I quote with confidence the answers to queries which I sent to two individuals. One states that, at the best of the season, the average milk from each is $4\frac{1}{2}$ gallons, and in a year 650 gallons; that in the summer season 32 gallons of entire milk will make 24 lbs. of cheese; and 48 gallons of skimmed milk will produce the same quantity: and that 90 gallons will make 24 lbs. of butter. Another farmer, who keeps a stock of between 30 and 40 very superior cows, always in condition, states that the average quantity of each is $687\frac{1}{2}$ gallons. Although there may be

* In some experiments conducted at the Earl of Chesterfield's dairy at Bradley-Hall farm, it appeared that, in the height of the season, the Holderness would yield 7 gallons and a quart; the long horn and the Alderney, 4 gallons 3 quarts; and the Devon, 4 gallons 1 pint per day; and when this was made into butter, the result was, from the Holderness, $38\frac{1}{2}$ ounces; from the Devon, 28 ounces; and from the Alderney, 25 ounces. The Ayrshire yields 5 gallons per day, and from that is produced 34 ounces of butter.

Ayrshire cows capable of giving 900 gallons in the year, it would be difficult to bring ten of them together; and in stocks, the greater number most carefully selected and liberally fed, from 650 to 700 gallons is the very highest produce of each in the year."

Mr. Rankine, on his own farm, the soil of an inferior nature, produced about 550 gallons, and the receipts amounted to only £7 13s. 6d. per cow.

We have entered at length into this, because it is of importance to ascertain the real value and produce of this breed of cattle.

The Ayrshire cattle are not yet sufficiently known, and cannot be procured cheap enough, or in adequate numbers, to undergo a fair trial in the south. Some have been tried in the London dairies. As mere milkers, they could not compete with the long-established metropolitan dairy cow, the short-horn. They yielded as much milk, in proportion to size and food, but not in proportion to the room occupied, and the increased trouble which they gave from being more numerous, in order to supply the requisite quantity of milk. They produced an unusual quantity of rich cream; but there was so much difficulty in procuring them, to keep up the stock, and the price asked so great, that they were compartively abandoned.

The fattening properties of the Ayrshire cattle we believe to be exaggerated. They will feed kindly and profitably, and their meat will be good. They will fatten on farms and in districts where others could not, except supported by artificial food. They unite, perhaps, to a greater degree than any other breed, the supposed incompatible properties of yielding a great deal of milk and beef. It is, however, on the inferior soil and the moist climate of Ayrshire, and the west of Scotland, that their superiority as milkers is most remarkable. On their natural food of poor quality they give milk abundantly and long, and often until within a few days of calving; but when they are moved to richer pasture, their constitution changes, and they convert their food more into beef. In their own country, a cow of a fleshy make, and which seldom proves a good milker, may be easily raised to 40 or 50 stones, and bullocks of three years old are brought to weigh from 50 to 60 stones. There is a lurking tendency to fatten about them which good pasture will bring forth; so that when the Ayrshire cow is sent to England she loses her superiority as a milker, and begins to accumulate flesh. On this account it is that the English dealers who purchase the Ayrshire cows generally select the coarsest animals, to avoid the consequence of the change of climate and food. It is useless to exaggerate the qualities of any cattle, and it cannot be denied that even in this tendency to fatten when their milk begins to fail, or which often causes it to fail, the Ayrshires must yield to their forefathers the Highlanders, and to their neighbors the Galloways, when put on a poor soil; and they will be left considerably behind their short-horn sires when transplanted to

luxuriant pasture. It will be long, perhaps, before they will be favorites with the butchers, for the fifth quarter will not usually weigh well in them. Their fat is mingled with the flesh rather than separated in the form of tallow; yet this would give a more beautiful appearance to the meat, and should enhance its price to the consumer.

Two circumstances, however, may partially account for their not being thought to succeed so well when grazed: they are not able to travel so far on the same keeping as the Highland cattle; and, from their great value as milkers, they are often kept till they are too old to fatten to advantage, or for their beef to be of the best quality.

CHAPTER IV.

THE POLLED CATTLE.

THE GALLOWAYS.

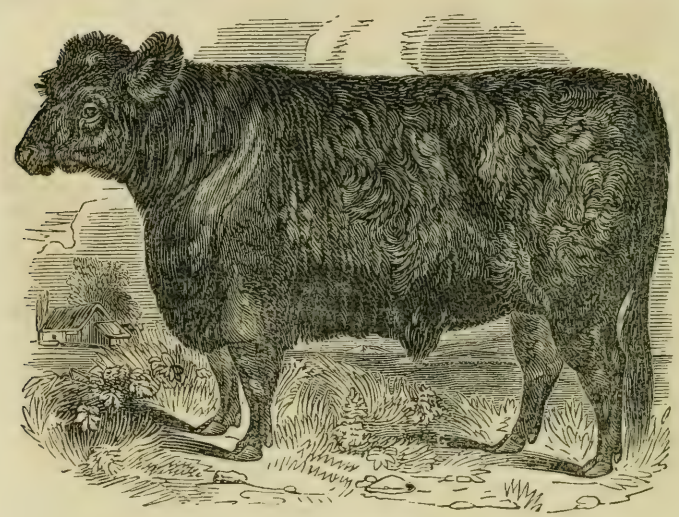
The stewartry of Kircudbright and the shire of Wigton, with a part of Ayrshire and Dumfries, formed the ancient province of Galloway. The two first counties possess much interest with us as the native district of a breed of *polled*, or *dodded*, or *humble* cattle, highly valued for its grazing properties. So late as the middle of the last century, the greater part of the Galloway cattle were horned—they were middle-horns: but some were polled—they were either remnants of the native breed, or the characteristic of the aboriginal cattle would be occasionally displayed, although many a generation had passed.

For more than 150 years the surplus cattle of Galloway had been sent far into England, and principally into the counties of Norfolk and Suffolk. The polled beasts were always favorites with the English farmers; they fattened as kindly as the others, they attained a larger size, their flesh lost none of its fineness of grain, and they exhibited no wildness and dangerous ferocity which are sometimes serious objections to the Highland breed. Thence it happened that, in process of time, the horned breed decreased, and was as length quite superseded by the polled.

The agriculture of Galloway and its cattle were much advanced by the Earl of Selkirk, and his son, Lord Daer; and among the most zealous and successful improvers of the breed of Galloway cattle were the Murrays of Broughton, the Herons of Kirrouchtrie, the Gordons of Greenlaw, the Maxwells of Munches, and the Maitlands in the valley of Tarff, in Kircudbright; and in Wigton, the Earls of Galloway, the Maxwells of Mouneith, the McDowals of Logan, the Cathcarts of Genoch, the Hathorns of Castle-Wig, and the Stewarts of Phygell.

The Galloway cattle are straight and broad in the back, and nearly level from the head to the rump, are round in the ribs, and also between the shoulders and the ribs, and the ribs and the loins, and broad in the loin, without any large projecting hook bones. In

roundness of barrel and fullness of ribs they will compare with any breed, and also in the proportion which the loins bear to the hook bones, or protuberances of the ribs. When viewed from above, the whole body appears beautifully rounded, like the longitudinal section of a roller. They are long in the quarters and ribs, and deep in the chest, but not broad in the twist. There is less space between the hook or hip bones and the ribs than in most other breeds, a consideration of much importance, for the advantage of length of carcass consists in the animal being well ribbed home, or as little space as possible lost in the flank.



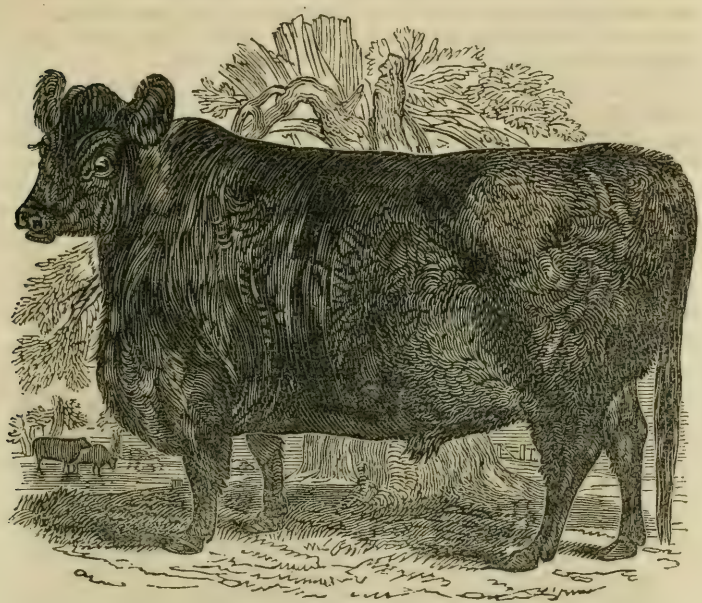
LEAN GALLOWAY OX.

The Galloway is short in the leg, and moderately fine in the shank bones—the happy medium preserved in the leg, which secures hardihood and disposition to fatten. With the same cleanness and shortness of shank, there is no breed so large and muscular above the knee, while there is more room for the deep, broad, and capacious chest. He is clean, not fine and slender, but well proportioned in the neck and chaps; a thin and delicate neck would not correspond with the broad shoulders, deep chest, and close, compact form of the breed. The neck of the Galloway bull is thick almost to a fault. The head is rather heavy; the eyes are not prominent, and the ears are large, rough, and full of long hairs on the inside.

The Galloway is covered with a loose mellow skin of medium thickness, which is clothed with long, soft, silky hair. The skin is

thinner than that of the Leicestershire, but not so fine as the hide of the short-horn but it handles soft and kindly.

The prevailing and fashionable color is black—a few are of a dark brindle brown, and still fewer speckled with white spots, and some of them are of a dun or drab color. Dark colors are uniformly preferred, from the belief that they indicate hardiness of constitution.



GALLOWAY OX IN GOOD CONDITION.

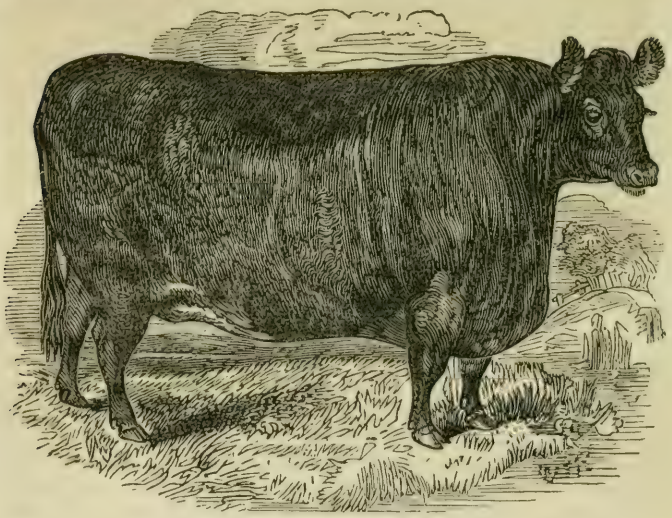
The breeding of cattle has been, from time almost immemorial, the principal object of pursuit with the Galloway farmer. The soil and face of the country are admirably adapted for this. The soil, although rich is dry and healthy. There are many large tracts of old grass land, that have not been ploughed during any one's recollection, and which still maintain their superior fertility ; while the finer pastures are thickly covered with natural white clover, and other valuable grasses. The surface of the ground is irregular, sometimes rising into small globular hills, and at other times into abrupt banks, and thus forming small fertile glens, and producing shelter for the cattle in the winter and early vegetation in the spring. In the low districts there is little frost and snow, but the climate is mild and

rather moist; and thus a languid vegetation is supported during the winter, and pastures constantly retain their verdure.

The young cattle are chiefly bred and reared to a certain age upon the higher districts, or upon the inferior lands in the lower grounds. A few cows are kept in the richer soils to produce milk, butter, and cheese for the families; but it is found more porfitable to breed and rear the cattle upon inferior lands, and afterwards to feed them upon the finer ground and the rich old pastures. There would be no objection to this if the Galloway farmers would afford their young stock a little shelter from the driving blasts of winter.

The regular Galloway breeders rarely sell any of their calves for veal; which is obtained only from those who keep cows for supplying the villagers with milk, and from the few dairy farms where cows are kept for making cheese.

The best heifers are retained as breeders, in order to supply the place of those whose progeny is not valuable, or who are turned off on account of their age. The other female calves are spayed during the first year. The spayed heifers are usually smaller than the bullocks, but they arrive sooner at maturity; they fatten readily; their meat is considered more delicate, and, in proportion to their size, they sell at higher prices than the bullocks.



FAT GALLOWAY COW.

Mr. Culley says, "In Galloway they spay more heifers than perhaps in all the island besides, and in this too their method is differ-

ent from any other part I am acquainted with, for they do not castrate them until they are about a year old." They are now generally spayed much earlier than they used to be, but some of the breeders adhere to the old custom.

The young cattle are rarely housed after the first winter; they are on their pastures day and night, but in cold weather, they receive hay and straw in the fields, supporting themselves otherwise on the *foggage* left unconsumed after the summer grass. Many of the farmers are beginning to learn their true interest, and the pastures are not so much overstocked in summer as they used to be, and a portion of herbage is left for the cattle in the winter; therefore, although the beasts are not in high condition in the spring, they have materially increased in size, and are in a proper state to be transferred to the rich pastures of the lower district.

GALLOWAY COW.

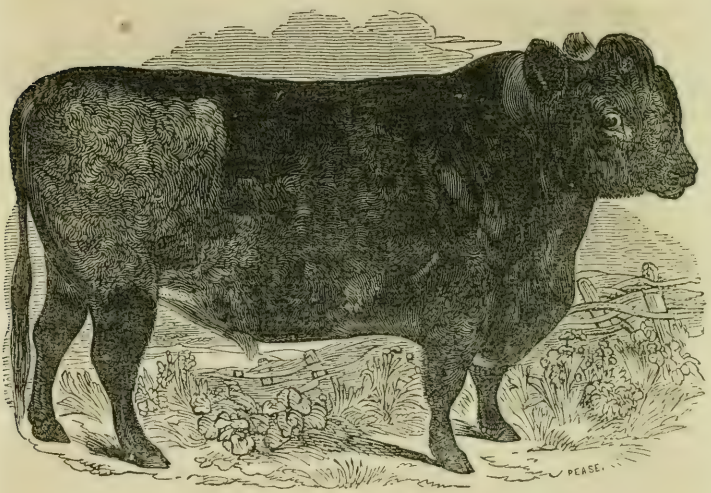
The Galloway cows are not good milkers; but although the quantity of the milk is not great, it is rich in quality, and yields a large proportion of butter. A cow that gives from twelve to sixteen quarts per day is considered very superior, and that quantity produces more than a pound and a half of butter. The average, however, of a Galloway cow cannot be reckoned at more than six or eight quarts per day, during the five summer months after feeding her calf. During the next four months she does not give more than half that quantity, and for two or three months she is dry.

It has been said that the young Galloway cattle are more exposed than others to *Redwater*, particularly on grass lands wanting lime.

Quarter Evil is also a frequent and fatal disease among these young cattle. When the Galloways become two years old, they will yield in hardiness to none, and are comparatively exempt from every complaint.

It has been remarked in this, as in some other breeding districts, that cows and heifers of good quality are to be met with everywhere, but that it is difficult to find a Galloway bull free from defect. Too many breeders have become careless from this circumstance. They have been contented with a bull of moderate pretensions, and the form and value of their cattle have been depreciated; yet not to the extent that might be feared, for the imperfections of the sire do not always appear in the progeny, but the sterling characteristics of the Galloway cattle break out again, although obscured in one generation.

A bullock well fattened will weigh from 40 to 60 stones at 3 or $3\frac{1}{2}$ years old, and some have been fed to more than 100 stones imperial weight, at 5 years old.



GALLOWAY BULL.

It has often and truly been remarked, with regard to the Galloway cattle, that while in most other breeds of Scotland there may be some good beasts, but mingled with others of a different and very inferior kind, there is a uniform character, and that of excellence, here; one bullock selected at haphazard may generally be considered a fair sample of the lot. The breeders know, from long experience,

what kind of cattle will please the farmers in Norfolk, by whom they are chiefly prepared for the London market, and to that kind they most carefully adhere. The drover likewise becomes, by his profession, an excellent judge of cattle, which he often purchases in large lots. He is unable to handle half of them, but long practice has taught him to determine at a glance whether they are of equal value and will prove good feeders.

There is, perhaps, no breed of cattle which can be more truly said to be indigenous to the country, and incapable of improvement by any foreign cross, than the Galloways. The short-horns almost everywhere else have improved the cattle of the districts to which they have traveled; at least in the first cross produced manifest improvement; but even in the first cross, the short-horns have done little good in Galloway, and, as a permanent mixture, the choicest southern bulls have manifestly failed. The intelligent Galloway breeder is now perfectly satisfied that his stock can only be improved by adherence to the pure breed, and by care in the selection.

The Galloway cattle are generally very docile. This is a most valuable point about them in every respect. It is rare to find even a bull furious or troublesome.

During the last fifty years a very great improvement has taken place in the rearing and grazing of cattle in Galloway. Most of the great landholders farm a portion of their own estates, and breed and graze cattle, and some of them very extensively. Agricultural societies have been established in the counties of Kirkcudbright and Wigton, and all the land-proprietors, and the greater part of the tenants, have become members of them. These societies have been enabled to grant numerous premiums for the best management and rearing of stock, and the consequence has been very considerable improvement in the breed of cattle, on the undeviating principle, however, of selection and adherence to the pure breed.

COMPARATIVE FEEDING PROPERTIES OF THE SCOTS AND DEVONS.

Francis, Duke of Bedford, in 1795, commenced a series of experiments to test the feeding properties of the various breeds of cattle; and there were few breeds whose relative qualities and value were not put fairly to the test at his estate of Woburn Abbey, and one breed after another was abandoned, until at his death in 1802, he was balancing between the Devons and Herefords.

His brother, who succeeded him, gave preference to the Herefords for feeding, and the West Highlanders for grazing. He abandoned the Devons only as not suiting the soil of Woburn.

The following are experiments made between Devons and West Highlanders and Galloways.

"Twenty Devons and twenty Scots were bought in October, 1822, and wintered.

"Ten of each sort were fed in a warm straw-yard upon straw alone, but with liberty to run out upon the moor.

"Ten were fed in a meadow, having hay twice every day until Christmas.

"They afterwards lay in the farm-yard, and had oat-straw and hay, cut together into chaff. They were then grazed in different fields, equal proportions of each sort being put into the same field.

"Those that lay in the warm straw-yard with straw only, were ready as soon as the others, although the others had an allowance of hay during the winter.

"Sixteen of each were sold at different times; March 24th, 1824, being the last sale. The Scots were ready first, and disposed of before the Devons.

	£	s.	d.
The Scots cost 7*l.* 12*s.* 10*d.* each, amounting to 122*l.* 5*s.* 4*d.*; they sold for 235*l.* 18*s.* 6*d.* Gain by grazing	113	13	2
The Devons cost 7*l.* 6*s.* 6*d.* each, amounting to 117*l.* 4*s.*, and they sold for 250*l.*; but not being ready, on the average, until between six and seven weeks after the Scots, and estimating their keep at 3*s.* 6*d.* per week each, amounting to 18*l.* 14*s.* 6*d.*, and this being subtracted from 250*l.*, there will remain as the sum actually obtained for them 231*l.* 5*s.* 6*d.* Gain	114	1	6
Making a balance in favor of the Devons of		8	4

The remaining four of each breed were kept and stall-fed on turnips and hay. The Scots sold at 75*l.*, and the Devons at 84*l.*, the account of which will be as follows:—

	£	s.	d.
Four Devons at 7*l.* 6*s.* 6*d.*, cost 29*l.* 6*s.*; they sold for 84*l.*; leaving gain by stall-feeding	54	14	0
Four Scots at 7*l.* 12*s.* 10*d.*, cost 30*l.* 11*s.* 4*d.*; they sold for 75*l.*; leaving gain by stall-feeding	44	8	8
Making balance in favor of Devons	10	5	4
Or total balance, adding the above 8*s.* 4*d.* in favor of Devons	10	13	8

This experiment seemed to establish the superiority of the Devons for both grazing and for stall-feeding. But as the gain by the four stall-fed Devons was half as much as that by the sixteen Scots at straw-yard, it was determined that another experiment should be made, in which the whole should be fed alike, both at grass and in the stall.

Twenty Scots and twenty Devons were again bought in October, and sold at different times, but always in equal number of each at each time, the last sale taking place in March.

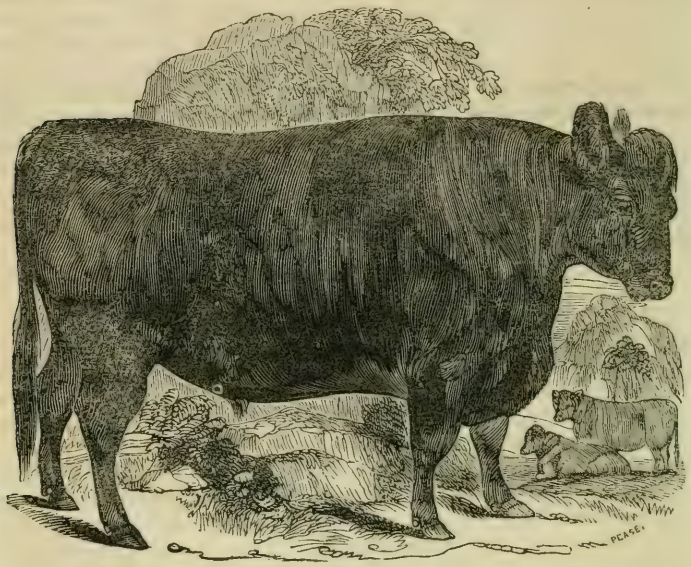
	£	s.	d.
The twenty Devons cost 189*l.* 9*s.*; they sold for 370*l.* 17*s.* 10*d.*; leaving for feeding	181	8	10
The twenty Scots cost 212*l.* 3*s.*; they sold for 374*l.* 5*s.* 1*d.*; leaving for feeding	162	1	1
Balance in favor of the Devons	£19	9	9

We condense the second experiment. Two Scots were fed on English linseed cakes; two Devons on unboiled linseed; two others on boiled linseed, and another pair of Devons on foreign, all of them having as much hay and chaff as they could eat. It was a losing concern in every case; the value of the manure was not equal to the difference of the cost and the selling prices, and strange as it may appear, the greatest loss was sustained when the beasts were fed on oil cake, the next when foreign cake was used, the next when boiled linseed was used, and the least of all when the simple unboiled linseed was given.

ANGUS POLLED CATTLE.

There have always been some polled cattle in Angus; the country people call them *humlies* or *dodded* cattle. Their origin is so remote, that no account of their introduction into this country can be obtained from the oldest farmers or breeders. The attention of some enterprising agriculturists appears to have been first directed to them about sixty years ago, and particularly on the eastern coast, and on the borders of Kincardineshire. Some of the first qualities which seem to have attracted the attention of these breeders were the peculiar quietness and docility of the doddies, the easiness with which they were managed, the few losses that were incurred from their injuring each other in their stalls, and the power of disposing of a greater number of them in the same space.

ANGUS OX, FAT.



ANGUS OX, FEEDING.

A few experiments upon them developed another valuable quality —their natural fitness for stall-feeding, and the rapidity with which they fattened. This brought them into much repute.

They have much of the Galloway form, and by those unaccustomed to cattle would be often mistaken for the Galloways. A good judge, however, would perceive that they are larger, somewhat longer in the leg, thinner in the shoulder, and flatter in the side.

Climate and management have caused another difference between the Angus doddies and the Galloways. The Galloways have a moist climate; they have a more robust appearance, a much thicker skin, and a rougher coat of hair than the Angus oxen. The Angus cattle are regularly kept in straw-yards during six months of the year, receiving turnips with their fodder every day, and in summer are grazed on dry and warm pastures. By this mode of treatment they look and feel more kindly than the Galloways.

The greater part of them are black, or with a few white spots. The next general color is yellow, comprehending the brindled, dark red, and silver-colored yellow. They are a valuable breed, and have rapidly gained ground on the horned cattle, and become far more numerous, particularly in the Lowlands; and when the agriculturist now speaks of the Angus breed, he refers to the polled species.

ANGUS COW, FAT.

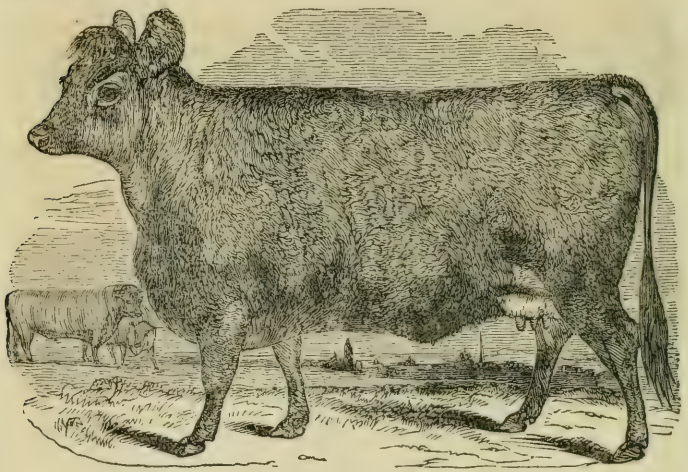
The quantity of milk yielded by the dairy cows is various. In the hilly districts from two to three gallons are given per day, but that is very rich. In the lowlands the cows will give five gallons during the best of the season. The cows of this district were formerly regarded as some of the best dairy-cows in Scotland, but since the breed has been more improved, and greater attention paid to the fattening qualities, they have fallen off in their character for the pail. About half of the milk is consumed at home, the rest is made into butter and cheese. The butter, as is generally the case in this part of Scotland, is good, but the cheese poor and ill-flavored. No oxen are used on the road, and few for the plough.

The Angus polled cattle, like many other breeds, are exceedingly valuable in their own climate and on their own soil, but they do not answer the expectations of their purchasers when driven south. They yielded a good remunerating price, but they are not quite equal to their ancestors the Galloways in quickness of feeding, or fineness of grain. They attain a larger size, but do not pay the grazier or butcher so well.

NORFOLK POLLED CATTLE.

Until the beginning of the last century, and for some years afterward, the native breed of Norfolk belonged to the middle-horns. They have, however, been almost superseded by a *polled* breed.

From a very early period, a great part of the Galloway cattle were prepared for the Smithfield market on the pastures of Norfolk and Suffolk. Some of the Galloways, accidentally, or selected on account of their superior form and quality, remained in Norfolk; and the farmer attempted to neutralize and to rear in his own county a breed of cattle so highly valued in the London market. To a certain degree he succeeded; and thus the polled cattle gradually gained upon the horned, and became so much more numerous and profitable than the old sort, that they began to be regarded as the peculiar and native breed of the county.



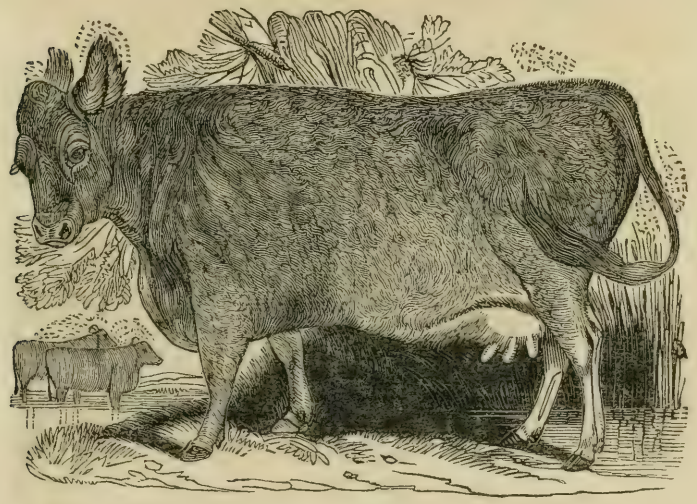
NORFOLK COW.

They retain much of the general form of their ancestors, the Galloways, but not all their excellencies. They have been enlarged but not improved by a southern climate and a richer soil. They are usually red; some, however, are black, or either of these colors mixed with white, with a characteristic golden circle about the eye. They are taller than the Galloways, but thinner in the chine, flatter in the ribs, longer in the legs, somewhat better milkers, of greater weight when fattened, but not fattening so kindly, and the meat not quite equal in quality.

SUFFOLK.

The Suffolk Dun used to be celebrated in almost every part of the kingdom, on account of the extraordinary quantity of milk that she yielded. The dun color is now, however, rarely seen in Suffolk, and rejected as an almost certain indication of inferiority. The breed is *polled.*

The Suffolk, like the Norfolk beast, undoubtedly sprung from the Galloway; but it is shorter in the leg, broader and rounder than the Norfolk, with a greater propensity to fatten, and reaching to greater weights.



SUFFOLK COW.

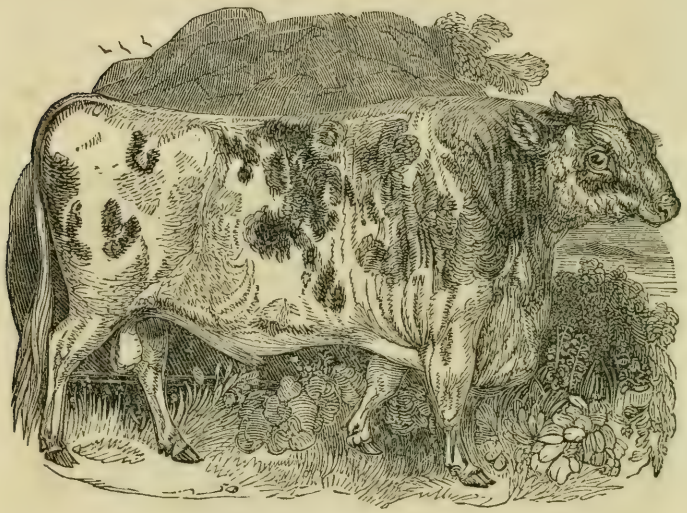
The prevailing and best colors are red, red and white, brindled, and a yellowish cream color. The bull is valued if he is of a pure unmingled red color.

Exaggerated accounts have been given of the milking of the Suffolk cow, and she is not inferior to any other breed in the quantity of milk that she yields. In the height of the season some of these cows will give as much as 8 gallons of milk in the day; and 6 gallons is not an unusual quantity. The produce of butter, however, is not in proportion to the quantity of milk.

The bulls are rarely suffered to live after they are three years

old, however excellent they may be, for the farmer believes that if they are kept longer they do not get a stock equally good, and particularly that their calves are not so large after that period. Nothing can be more erroneous or mischievous. A bull is never in finer condition than from four to seven years old.

Having obtained by accident, or by exertion, a good breed of milkers, the Suffolk people have preserved them almost by mere chance, and without any of the care and attention which their value demanded.



SUFFOLK BULL.

The Suffolk cow, poor and angular as she may look, fattens with a rapidity greater than could be expected from her gaunt appearance. Whence she obtained the faculty of yielding so much milk, is a question that no one has yet solved. Her progenitor, the Galloway, has it not. The Holderness could scarcely be concerned; for more than a hundred years ago, the Suffolk dun was as celebrated as a milker as the breed of this county is at present, and the Holderness had not then been introduced into the county of Suffolk. The fattening property derived from the northern breed is yet but little impaired. The cow is easily fattened to forty or five-and-forty stones, (500 to 600 lbs.) and the quality of her meat is excellent.

CHAPTER V.

THE IRISH CATTLE.

Before we enter on the consideration of the two remaining breeds of English cattle, the long and the short-horns, we will take a very rapid glance at the Irish cattle.

They are evidently composed of two distinct breeds; the middle and the long-horns.

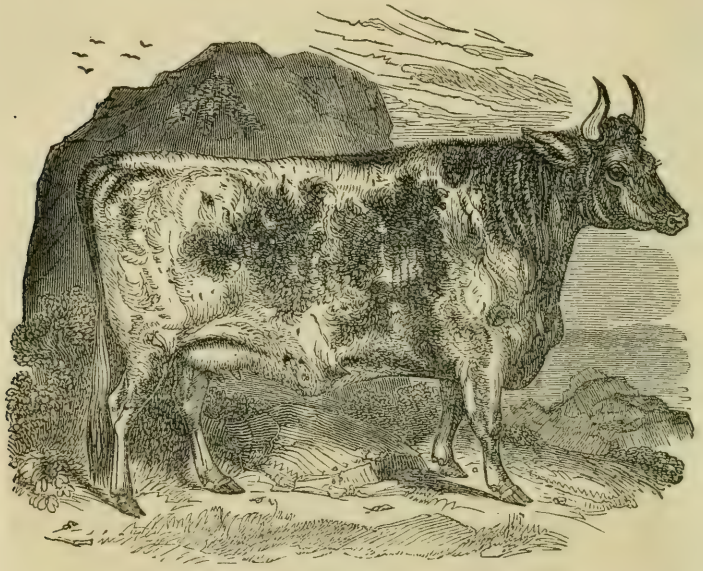
The middle-horns are plainly an aboriginal breed. They are found on the mountains and rude parts of the country, in almost every district. They are small, light, active, and wild. The head is small, although there are exceptions to this in various parts; and so numerous, indeed, are those exceptions, that some describe the native Irish cattle as having thick heads and necks; the horns are short compared with the other breed, all of them fine, some of them rather upright, and frequently, after projecting forward, then turning backward. Although somewhat deficient in the hind-quarters, they are high-boned, and wide over the hips, yet the bone generally is not heavy. The hair is coarse and long; they are black, brindled, and black or brindled, with white faces. Some are finer in the bone, and finer in the neck, with a good eye, and sharp muzzle, and great activity.

They are exceedingly hardy; they live through the winter, and sometimes fatten on their native mountains and moors; and when removed to a better climate and soil, they fatten with all the rapidity of the aboriginal cattle of the Highlands and Wales. They are generally very good milkers, and many of them are excellent. The cow of Kerry, a portrait of which is here presented, is a favorable specimen of them.

The cow of Kerry is truly a poor man's cow, living everywhere hardy, yielding, for her size, abundance of milk of a good quality, and fattening rapidly when required. The slightest inspection of the cut will convince the reader of the difference between this breed and both the larger and the smaller long-horned Irish one.

These cattle usually are small, and are confined to the hilly and moor grounds. Some are of considerable size, elsewhere, and are improved in form as well as in weight. The horns, usually of middle

length, turn up; as do the horns of those on the mountains; they are shorter in the leg, shorter in the body; their loins and haunches are heavy and wide; although the hair is thick, the hide is mellow, and they thrive with rapidity.



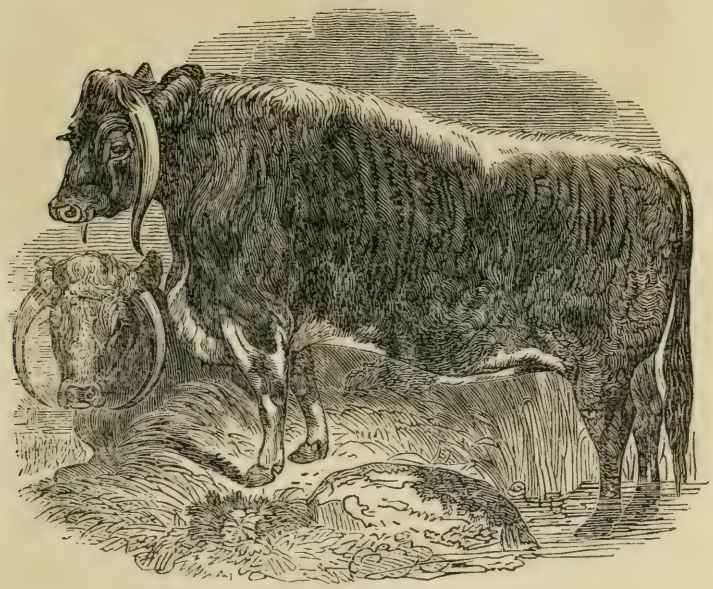
KERRY COW.

This breed is now not to be met with pure, exept inland on the mountains; being nearly worn out elsewhere by the repeated crosses with the Leicester, Hereford, and Devon; but for the dairy, all the farmers still prefer those cows with most of the native Irish blood.

The other breed is of a larger size. It is the old or the partially improved Craven or Lancashire beast. It is the true long-horn; the horns first taking a direction outward, then forming a curve, and returning towards the face, sometimes threatening to pierce the bones of the nose, at other times so to cross before the muzzle that the animal is unable to graze.

The following cut represents this large variety of Irish cattle, and is evidently identical with the Craven or Lancashire. In Tipperary, Limerick, Meath, a great part of Munster, and particularly in Roscommon, many of these cattle are found, which are most valuable animals.

Whence these long-horns originally came, is a question. There is no doubt that they very much resemble the English long-horns, and have been materially improved by them; but whether Ireland or England was the native country of this breed, will never be determined. Ancient records are silent on the subject; and in both countries we can trace the long-horns to a very remote period. Many persons have concluded that the English long-horns sprung from some of the imported Irish ones. Others, however, with more reason, finding the middle-horns in every mountainous and unfrequented part of the country, and the long-horns inhabiting the lower and more thickly inhabited districts, regard the middle-horns as the pure native breed, and the long-horns to have been a stranger race, and introduced probably from Lancashire, where a breed of cattle of the same character and form is found.



IRISH CATTLE.

However this may be, there was a variety of circumstances which rendered the march of improvement much more rapid in England than in Ireland. While the British long-horns had materially improved, those in Ireland had not progressed in the slightest degree.

More than a century ago, zealous agriculturists in Meath com-

menced improvement. Mr. Waller introduced some old Lancashires. Sixty years afterwards, was brought over one of the new Leicester breed, and there was scarcely a cottager near him that did not possess a cow displaying some traces of the Leicester blood. The Earl of Bective and Mr. Noble contributed to the improvement of the breed in this part of Ireland.

About the same time, Lord Massarene and others introduced some fine long-horned cattle into Antrim; and Lord Farnham into Cavan. In Langford, the Earl of Rosse; in Clare, Sir Edward O'Brien, Mr. Doxon, Mr. Moloney, and Mr. Blood. In Roscommon, the Messrs. Finch; and indeed almost every county and barony of Ireland had its zealous and successful improver of the native breed, until, in the richer and more cultivated districts, the cattle became of as great a size and as perfect form as any of the midland districts of England.

There are at the present two kinds of these cattle in Ireland, in character essentially different; the larger, which we have described, and a smaller, prevailing principally in the north of the island. At first view, perhaps, these would appear to be the same cattle, only smaller from poor keep and bad management; but their horns, long out of all proportion, clumsy heads, large bones and thick hides, bulkiness of dewlap contrasted with their lightness of carcass, in fine, an accumulation of defects about them, clearly mark them as being of far inferior value.

In process of time, the English long-horns, although of the improved Bakewell breed, began to lose ground even in their native country; or rather a rival with higher merits appeared in the field. The short-horns began to attract the attention of the breeder; and their propensity to fatten, and earlier maturity, soon became evident. There were not wanting spirited agriculturists in Ireland, who quickly availed themselves of this new mode of improving the Hibernian cattle. Sir Henry Vane Tempest was one of the first who introduced the short-horn bull. The improvement effected by the first cross was immediately evident in the early maturity of the progeny. The pure short-horn, or this cross with the long-horn, weighed as much at three years old as the pure long-horn used to do at five. But the first experiment in a great degree failed.

The reputation of the short-horn, however, becoming more spread in England, other attempts were made to introduce him into Ireland, and the experiments were more systematically conducted. And great improvement has been effected in the Irish cattle of late years, by the importation of the Durham breed. They have displaced a cross of the long-horn Leicester on the Irish cow, and the farmers of the country now prefer a cross of the Durham bull on the Irish cow, to the pure breed, as being less delicate, and giving a richer and greater quantity of milk.

CHAPTER VI.

THE LONG-HORNS.

In the district of Craven, a fertile corner of the West Riding of Yorkshire, there has been, from the earliest records of British agriculture, a peculiar and valuable breed of cattle. They were distinguished from the home-breds of other counties by a disproportionate and frequently unbecoming length of horn. In the old breed this horn frequently projected nearly horizontally on either side, but as the cattle were improved the horn assumed other directions; it hung down so that the animal could scarcely graze, or it curved so as to threaten to meet before the muzzle, and so also as to prevent the beast from grazing; or immediately under the jaw, and so to lock the lower jaw; or the points presented themselves against the bones of the nose and face, threatening to perforate them. In proportion as the breed became improved, the horns lengthened, and they are characteristically distinguished by the name of "The Long-Horns." Cattle of a similar description were found in the districts of Lancashire bordering on Craven, and also in the south-eastern parts of Westmoreland; but tradition in both of these districts pointed to Craven as the original habitation of the long-horn breed. If there gradually arose any difference between them, it was that the Craven beasts were the broadest in the chine, the shortest, the handsomest, and the quickest feeders; the Lancashire ones were larger, longer in the quarters, but with a fall behind the shoulders, and not so level on the chine.

Whence these cattle were derived was and still is a disputed point. The long horns seem to have first appeared in Craven, and gradually to have spread along the western coast, and to have occupied almost exclusively the midland counties.

There are two distinct breeds; the smaller Cravens inhabiting the mountains and moorlands, hardy, useful, valued by the cottager and little farmer on account of the cheapness with which they are kept, the superior quantity and excellent quality of the milk which they yield, and the aptitude with which they fatten when removed to better pasture. The larger Cravens, occupying a more level and richer pasture, are fair milkers, although in proportion to their size

not equal to the others; but possess a tendency to fatten and acquire extraordinary bulk, scarcely inferior to that of short-horns.

As either of these found their way to other districts, they mingled to a greater or less degree with the native cattle, or they felt the influence of change of climate and soil, and gradually adapted themselves to their new situation; and each assumed a peculiarity of form which characterized it as belonging to a certain district, and rendered it valuable and almost perfect there. The Cheshire, the Derbyshire, the Nottinghamshire, the Staffordshire, the Oxfordshire, and the Wiltshire cattle were all essentially long-horns, but each had its distinguishing feature, which seemed best to fit it for its situation, and the purposes for which it was bred. Having assumed a decided character, varying only with peculiar local circumstances, the old long-horns, like the Devons, the Herefords, and the Scotch, continued nearly the same. There is no authentic detail of their distinguishing points. From hints given by old writers, we may conclude that some of them at least were characterized by their roundness and length of carcass, coarseness of bone, thickness and yet mellowness of hide, and the rich quality although not abundant quantity of their milk.

OLD CRAVEN LONG-HORN BULL.

Here were evident materials for some skillful breeder to work upon; a connection of excellencies and defects by no means inseparable. That which was good might be rendered more valuable, and the alloy might be easily thrown off. It was not, however, until about the year 1720 that any agriculturist possessed sufficient science and spirit to attempt improvement in good earnest. A blacksmith and farrier, of Linton, in Derbyshire, on the very borders of Leicestershire, who rented a little farm, has the honor of standing first on the list. His name was Welby. He had a valuable breed of cows, which came from Drakelow house, a seat of Sir Thomas Gresley, on the banks of the Trent, about a mile from Burton. He prided himself much in them, and they deserved the care which he took in improving them and keeping the breed pure; but a disease, which defied all remedial measures, carried off the greater part of them, thus half ruining Welby, and putting a stop to his speculations.

Soon after this Mr. Webster, of Canley, near Coventry, distinguished himself as a breeder. He too worked upon Sir Thomas Gresley's stock, some of whose cows he brought with him when he first settled at Canley. He procured bulls from Lancashire and Westmoreland, and is said to have had the best stock of cattle then known. One of his admirers says that "he possessed the best stock, especially of *beace*, that ever were, or ever will be bred in the kingdom." This is high praise, and is evidence of the excellent quality of Mr. Webster's breed.

It is much to be regretted that we have such meagre accounts of the proceedings of the early improvers of cattle. Little more is known of Mr. Webster than that he established the Canley breed, some portion of whose blood flowed in every improved long-horn beast.

The bull, Bloxedge, (the Hubback of the long-horns,) indebted to accident for the discovery of his value, was out of a three-year old heifer of Mr. Webster's, by a Lancashire bull, belonging to a neighbor. When a yearling, he was so unpromising that he was discarded and sold to a person of the name of Bloxedge, (hence the name of the beast,) but turning out a remarkably good stock-getter, Mr. Webster re-purchased him, and used him for several seasons.

Now appeared the chief improver of the long-horns, to whom his cotemporaries and posterity have adjudged the merit of creating as it were a new breed of cattle. It is a disgrace to the agriculture of the times that Bakewell should have been suffered to pass away without some authentic record of the principles that guided him, and the means by which his objects were accomplished.

The only memoir we have of Robert Bakewell is a fugitive paper in the Gentleman's Magazine, from which every writer has borrowed. Robert Bakewell was born at Dishley, in Leicestershire, about 1725. Having remarked that domestic animals in general produced others

possessing qualities nearly similar to their own, he conceived that he had only to select from the most valuable breeds such as promised to return the greatest possible emolument, and that he should then be able, by careful attention to progressive improvement, to produce a breed whence he could derive a maximum of advantage. He made excursions into different parts of England, in order to inspect the different breeds, and to select those that were best adapted to his purpose, and the most valuable of their kind; and his residence and his early habits disposed him to give the preference to the long-horn cattle.

We have no account of the precise principles which guided him in the various selections which he made; but Mr. Marshall, who says that he "was repeatedly favored with opportunities of making ample observations on Mr. Bakewell's practice, and with liberal communications from him on all rural subjects," gives us some clue. He speaks of the general principles of breeding, and when he does this in connection with the name of Bakewell, we shall not be very wrong in concluding that these were the principles by which that great agriculturist was influenced.

"The most general principle is beauty of form. It is observable, however, that this principle was more closely attended to at the outset of improvement (under an idea, in some degree falsely grounded, that the beauty of form and utility are inseparable) than at present, when men, who have long been conversant in practice, make a distinction between a "useful sort" and a sort which is merely "handsome."

"The next principle attended to is a proportion of parts, or what may be called *utility* of form, in distinction from *beauty* of form; thus the parts which are deemed *offal*, or which bear an inferior price at market, should be small in proportion to the better parts.

"A third principle of improvement is the texture of the muscular parts, or what is termed *flesh*, a quality of live stock which, familiar as it may long have been to the butcher and the consumer, had not been sufficiently attended to by breeders, whatever it might have been by graziers. This principle involved the fact that the grain of the meat depended wholly on the *breed*, and not, as had been before considered, on the size of the animal. But the principle which engrossed the greatest share of attention, and which, above all others, is entitled to the *grazier's* attention, is *fattening quality*, or a natural propensity to acquire a state of fatness at an early age, when in full keep, and in a short space of time; a quality which is clearly found to be hereditary."

Therefore, in Bakewell's opinion, everything depended on breed; and the beauty and utility of the form, the quality of the flesh, and the propensity to fatness, were, in the offspring, the natural consequence of similar qualities in the parents. His whole attention was

centered in these four points; and he never forgot that they were compatible with each other, and might be occasionally found united in the same individual.

Improvement had hitherto been attempted by selecting females from the native stock of the country, and crossing them with males of an alien breed. Mr. Bakewell's good sense led him to imagine that the object might better be accomplished by uniting the superior branches of the same breed, than by any mixture of foreign ones.

On this new and judicious principle he started. He purchased two long-horn heifers from Mr. Webster, and he procured a promising long-horn bull from Westmoreland. To these, and their progeny, he confined himself; coupling them as he thought he could best increase or establish some excellent point, or speedily remove a faulty one.

As his stock increased, he was enabled to avoid the injurious and enervating consequence of breeding *too closely* "in and in." The breed was the same, but he could interpose a remove or two between the members of the same family. He could preserve all the excellences of the breed, without the danger of deterioration; and the rapidity of the improvement which he effected was only equaled by its extent.

Many years did not pass before his stock was unrivaled for the roundness of its form, and the smallness of its bone, and its aptitude to acquire external fat; while they were small consumers of food in proportion to their size; but, at the same time, their qualities as milkers were very considerably lessened. The *grazier* could not too highly value the Dishley, or new Leicester long-horn, but the *dairyman*, and the *little farmer*, clung to the old breed, as most useful for their purpose.

It was his grand maxim, that the bones of an animal intended for food could not be too small, and that the fat, being the most valuable part of the carcass, could, consequently, not be too abundant. In pursuance of this leading theory, by inducing a preternatural smallness of bone, and rotundity of carcass, he sought to cover the bones of all his animals, externally, with masses of fat. Thus, the entirely new Leicester breed, from their excessive tendency to fatten, produce too small a quantity of eatable meat, and that, too, necessarily of inferior flavor and quality. They are in general found defective in weight, proportionably to their bulk, and, if not thoroughly fattened, their flesh is crude and without flavor; while, if they be so, their carcasses produce little else but fat, a very considerable part of which must be sold at an inferior price, to make candles instead of food, not to forget the very great waste that must ever attend the consumption of over-fattened meat.

This great and sagacious improver, very justly disgusted at the sight of those huge, gaunt, leggy, and misshapen animals with which

his vicinity abounded, and which scarcely any length of time or quantity of food would thoroughly fatten, determined upon raising a more sightly and a more profitable breed; yet, rather unfortunately, his zeal impelled him to the opposite extreme. Having carefully, and at much cost, raised a variety of cattle, the chief merit of which is to make fat, he has apparently laid his disciples and successors under the necessity of substituting another that will make lean.

Mr. Bakewell had many prejudices opposed to him, and many difficulties to surmount, and it is not therefore to be wondered at if he was more than once involved in considerable embarrassment; but he lived to see the perfect success of his undertaking.

He died when verging on his seventieth year. His countenance bespoke activity and a high degree of benevolence. His manners were frank and pleasing, and well calculated to maintain the extensive popularity he had acquired. His hospitality to strangers was bounded only by his means.

Many anecdotes are related of his humanity towards the various tribes of animals under his management. He would not suffer the slightest act of cruelty to be perpetrated by any of his servants, and he sternly deprecated the barbarities practised by butchers and drovers; showing, by examples on his own farm, the most pleasing instances of docility in every animal.

Mr. Bakewell's celebrated bull TWOPENNY was the produce of the Westmoreland bull, out of old Comely, one of the two heifers purchased from Mr. Webster; therefore he was, by the side of his dam, a direct descendant of the Canley blood.

Mr. Bakewell had afterwards a more valuable bull than this, named D. He retained him principally for his own use, except that he was let for part of a season to Mr. Fowler, and that a few cows were brought to him at five guineas a cow. He was got by a son of Twopenny, out of a daughter and sister of the same bull, she being the produce of his own dam.

Starting a few years afterwards, and rivaling Mr Bakewell in the value of his cattle, was Mr. Fowler of Rollwright, in Oxfordshire. His cows were of the Canley breed; most of them having been purchased from Mr. Bakewell; and his bull Shakspeare, the best stock-getter that the long-horn breed ever possessed, was got by D, out of a daughter of Twopenny, and therefore of pure Canley blood.

Mr. Marshall gives the following description of this bull, and very interesting and instructive it is. It is a beautiful explication of some of the grand principles of breeding. "This bull is a striking specimen of what naturalists term *accidental varieties*. Though bred in the manner that has been mentioned, he scarcely inherits a single point of the long-horned breed, his horns excepted. In 1784, then six years old, and somewhat below his usual condition, though by no means low in flesh, he was of this description.

"His head, chap and neck remarkably fine and clean; his chest extraordinarily deep—his brisket down to his knees. His chine thin, and rising above the shoulder-blades, leaving a hollow on each side behind them. His loin, of course, narrow at the chine; but remarkably wide at the hips, which protuberate in a singular manner. His quarters long in reality, but in appearance short, occasioned by a singular formation of the rump. At first sight it appears as if the tail, which stands *forward*, had been severed, one of the vertebræ extracted, and the tail forced up to make good the joint; an appearance, which, on examining, is occasioned by some remarkable wreaths of fat formed round the setting on of the tail; a circumstance which in a picture would be a deformity, but as a *point* is in the highest estimation. The round bones snug, but the thighs rather full and remarbably let down. The legs short and their bone fine. The carcass, throughout, (the chine excepted) large, roomy, deep, and well spread.

"His horns apart, he had every point of a Holderness or a Tees-water bull. Could his horns have been changed, he would have passed in Yorkshire as an ordinary bull of either of those breeds. His two ends would have been thought tolerably good, but his middle very deficient; but being put to cows deficient where he was full, (the lower part of the thigh excepted,) and full where he was deficient, he has raised the long-horned breed to a degree of perfection which, without so extraordinary a prodigy, they never might have reached."

No wonder that a form so uncommon should strike the improvers of this breed of stock, or that points they had been so long striving in vain to produce should be rated at a high price. His owner was the first to estimate his worth, and could never be induced to part with him except to Mr. Princep, who hired him for two seasons, at the then unusual price of eighty guineas a season. He covered until he was ten years old, but then became paralytic and useless.

At a public sale of Mr. Fowler's cattle, 1791, the following prices were given for some of the favorite beasts—a sufficient proof of the estimation in which the improved Leicesters were then held:

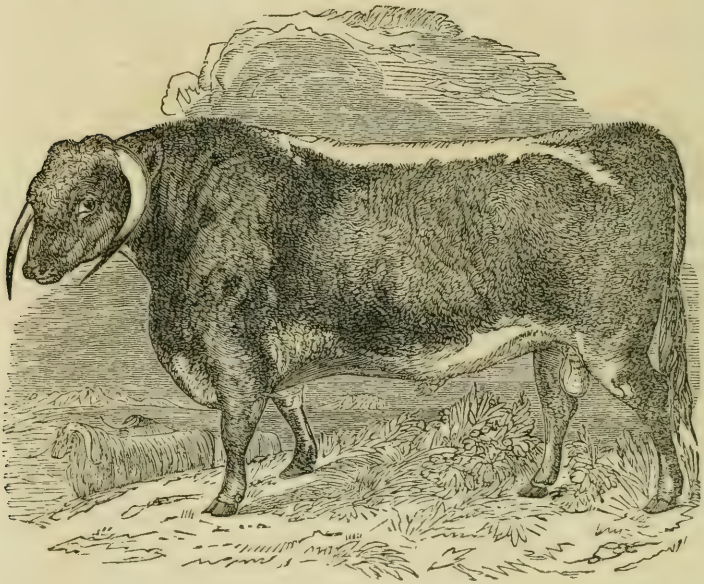
Bulls.—Garrick, five years old, £250; Sultan, two years old, £230; Washington, two years old, £215; A, by Garrick, one year old, £157; Young Sultan, one year old, £210; E, by Garrick, one year old, £152.

Cows.—Brindled Beauty, by Shakspeare, £273; Sister to,Garrick, £120; Nell, by Garrick, £136; Young Nell, by brother of Garrick, £126; Black Heifer, £141; Dam of Washington, £194. Fifty breed of cattle produced £4,289 4*s.* 6*d.*

Another improver of the long-horns was Mr. Princep of Croxall, in Derbyshire. He was supposed at that time to have the best dairy

of long-horn cows in the whole of the midland counties. He originally bred them from a cow of the name of Bright, who was got by Mr. Webster's Bloxedge, the father of the Canley blood, and he much improved his breed through the medium of Shakspeare. It was remarked, that every cow and heifer of the Shakspeare blood could be recognized at first sight as a descendant of his.

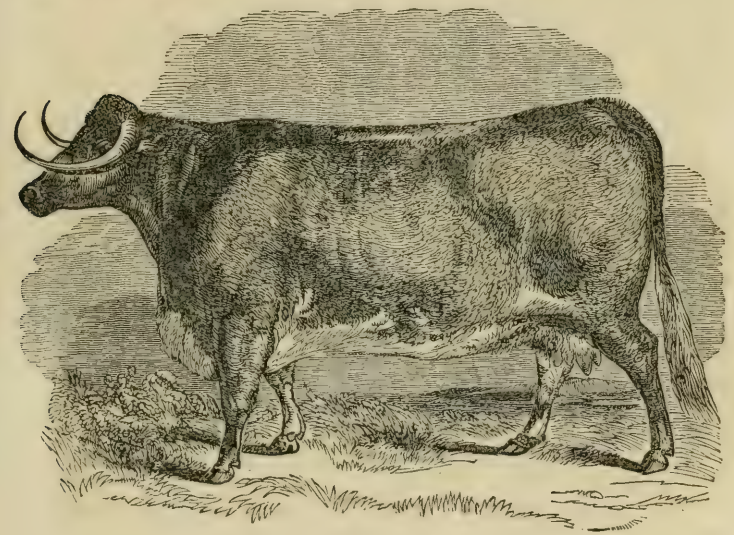
What was the result of all these combined efforts? Was a breed produced worthy of the talents and zeal of all these skillful agriculturists? On the Leicestershire cattle, and in particular districts in the neighboring counties, the change was great and advantageous, so far as the grazing and fattening, and especially the early maturity of the animals, were concerned.



NEW LEICESTER LONG-HORN BULL.

What is now become of this improved long-horn breed? Where is it to be found? It was a bold and a successful experiment. It seemed for a while to answer the most sanguine expectation of these scientific and spirited breeders. In the districts in which the experiments were carried on, it established a breed of cattle equaled by few, and excelled by none but the Herefords. It enabled the long-horns to contend, and often successfully, with the heaviest and best

of the middle-horns. It did more; it improved, and that to a material degree, the whole breed of long-horns. The Lancashire, the Derbyshire, the Staffordshire cattle became, and still are, an improved race; they got rid of a portion of their coarse bone. They began to gain their flesh and fat on the more profitable points, they acquired a somewhat earlier maturity, and, the process of improvement not being carried too far, the very dairy-cattle obtained a disposition to convert their aliment into milk while milk was wanted, and, after that, to use the same nutriment for the accumulation of flesh and fat. The midland counties will always have occasion to associate a feeling of respect and gratitude with the name of Bakewell.



NEW LEICESTER LONG-HORN COW.

Mr. Marshall thus describes the improved Leicesters in his own time, which was that of Bakewell, Princep, and Fowler.

"The *forend* long; but light to a degree of elegance. The neck thin, the chap clean, the head fine, but long and tapering.

"The *eye* large, bright and prominent.

"The *horns* vary with the sex, &c. Those of bulls are comparatively short, from fifteen inches to two feet; those of the few oxen that have been reared of this breed are extremely large, being from two and a half to three and a half feet long; those of the cows nearly as long, but much finer, tapering to delicately fine points. Most of them

hang downward by the side of the cheeks, and then, if well turned, as many of the cows are, shoot forward at the points.

"The *shoulders* remarkably fine and thin, in bone; but thickly covered with flesh—not the smallest protuberance of bone.

"The *girth* small, compared with the short-horn and middle-horn breeds.

"The *chine* remarkably full when fat, but hollow when low in condition."

This is considered by accurate judges to be a criterion of good mellow flesh. The large hard ligaments, (the continuation of the ligaments of the neck, united with those of the vertebræ of the spine itself,) which in some individuals, when in low condition, stretch tightly along the chine, from the setting on of the neck to the fore part of the loins, is said to be a mark of the flesh being of a bad quality. They are only proofs of great strength in the spine, and, probably, in the animal generally; and indicating that the meat will be sinewy and tough.

"The *loin* broad, and the *hip* remarkably wide and protuberant."

A wide loin, with projections of fat on the hips, may be desirable; but there can be neither beauty nor use in the protuberance of the tuberosities of the bone. A full hip may be of advantage, but scarcely a protuberant one.

"The *quarters* long and level; the *nache* of a middle width, and the *tail* set on variously, even in individuals of the highest repute.

"The *round-bones* small, but the *thighs* in general fleshy; tapering, however, when in the best form toward the gambrels.

"The *legs* small and clean, but comparatively long. The *feet* in general neat, and of the middle size.

"The *carcass* as nearly a cylinder as the natural form will allow. The *ribs* standing out full from the spine. The *belly* small.

"The *flesh* seldom fails of being of the first quality.

"The *hide* of a middle thickness.

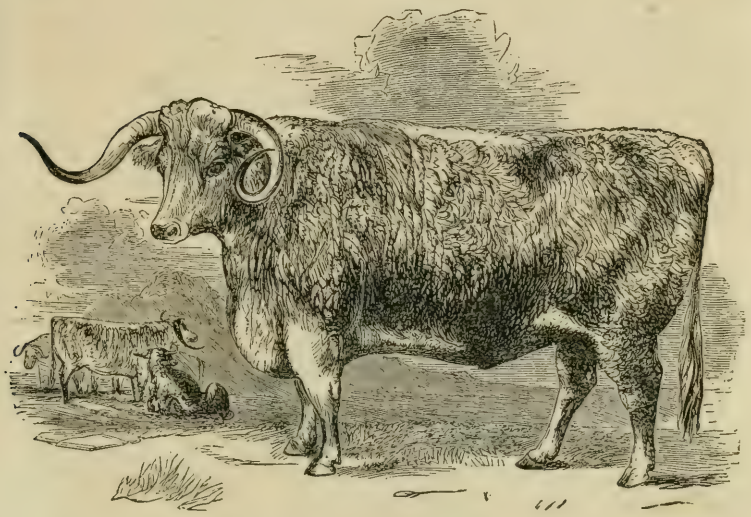
"The *color* various; the brindle, the finch-back, and the pye, are common. The *lighter*, the better they are esteemed.

"The *fattening* quality of this improved breed, in a state of maturity, is indisputably good.

"As *grazier's stock*, they undoubtedly rank high. The principle of the *utility of form* has been strictly attended to. The bone and offal are small, and the forend light; while the chine, the loin, the rump and the ribs are heavily loaded, and with flesh of the finest quality. In point of early maturity, they have also materially gained. In general, they have gained a year in preparation for the butcher; and although perhaps not weighing so heavy as they did before, the little diminution of weight is abundantly compensated, by the superior excellence of the meat, its earlier readiness and the smaller quantity of food consumed.

"As *dairy-stock*, it does not admit of doubt that their milking qualities have been very much impaired.

"As *beasts of draught*, their general form renders them unfit; yet many of them are sufficiently powerful, and they are more active than some other breeds used for the plough, or on the road; but the horns generally form an insuperable objection to this use of them."



THE LONG-HORN FEEDING OX.

But what is become of Bakewell's improved long-horn breed? A veil of mystery was thrown over most of his proceedings, which not even his friend Mr. Marshall was disposed to raise. The principle on which he seemed to act, breeding so completely "in and in" was a novel, a bold, and a successful one. Some of the cattle to which we have referred were very extraordinary illustrations, not only of the harmlessness, but the manifest advantage of such a system; but he had a large stock on which to work; and no one knew his occasional deviations from this rule, nor his skillful interpositions of remoter affinities, when he saw or apprehended danger.

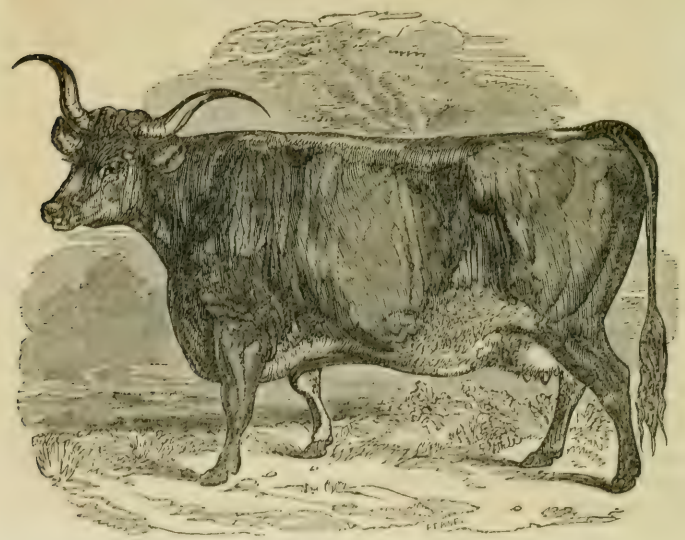
The truth of the matter is, that the master spirits of that day had no sooner disappeared, than the character of this breed began imperceptibly to change. It had acquired a delicacy of constitution, inconsistent with common management and keep; and it began slowly, but undeniably, to deteriorate. Many of them had been bred to that

degree of refinement, that the propagation of the species was not always certain.

In addition to this, a powerful rival appeared in the field, the short-horns of the Tees. They presented equal aptitude to fatten, and greater bulk and earlier maturity.

Westmoreland was the native land of the long-horns. Webster brought thence the father of the Canley stock; and Bakewell sought the father of his breed there: but even in Westmoreland the short-horns appeared; they spread; they established themselves; in a manner superseded the long-horns. They found their way to southern districts; they mingled with the native breeds; a cross from them generally bestowed increase of milk, aptitude to fatten, and early maturity. It is true, that a frequent recourse to the short-horn was generally necessary in order to retain these advantages, but these advantages were bestowed, and might be retained, except in a few districts, and for some particular purposes. Thus they gradually established themselves everywhere; they were the grazing cattle of the large farmer and the gentleman, and another variety of them occupied the dairy. The benefits conferred by the improved long-horns remained, but the breed itself gradually diminished; in some places it almost disappeared; and at the present moment, and even in Leicestershire, the short-horns are fast driving the long-horns from the field.

DERBYSHIRE.



DERBY COW.

The preceding cut is a faithful portrait of one of the best of them. The horns are altogether characteristic.

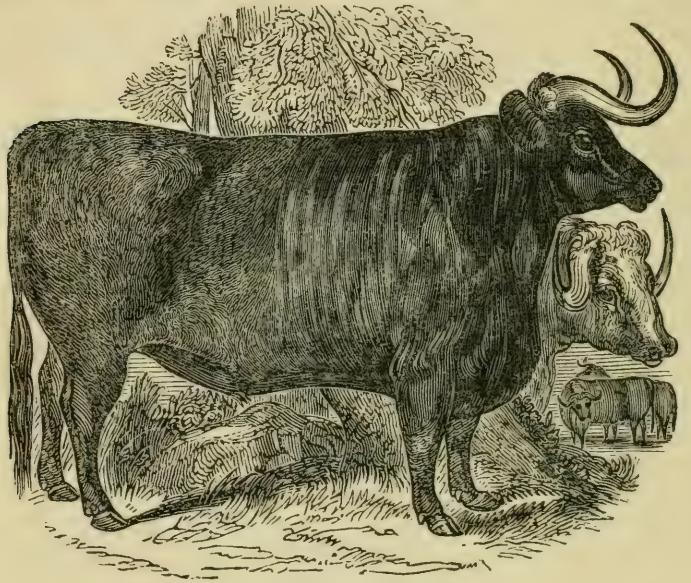
The Derbyshire cows were originally long-horns; and although of a somewhat inferior breed, they were very useful animals, and especially in the dairies of this county, the cheese of which has long been admired. What cross gave them their peculiar character, and especially their singular horns, it is now impossible to determine. The head was frequently thick and heavy, the chops and neck foul, the bone too large, the hide heavy, and the hair long; even the bag was often overgrown and covered with hair—a circumstance very objectionable to the dairyman; they were little disposed to take on flesh and fat, yet they were excellent dairy cows.

DERBY BULL.

This cut gives a faithful representation of the old Derby bull. This breed, however, has gradually died away, and it is comparatively seldom that a pure Derby can now be met with. The short-horns have taken possession of this portion of the territory of the long-horns also, and there are few dairy farmers now, and especially in the neighborhood of Derby, that have any long-horns in their dairies; and yet it is confidently asserted that some cows of the ancient stock have yielded as much as seventeen pounds of butter in a week.

THE SHROPSHIRE CATTLE.

The old Shropshire cattle, with a cut of one of which we are enabled to present our readers, was of a long-horn hardy kind—of all colors, but generally brown mixed with bay and white, and with a streak of white running along the back and under the belly. They were raw-boned, cow-legged, and far from being handsome. They were, however, good milkers and fit for the dairy.



THE OLD SHROPSHIRE OX.

Very few of the old sort are now left, but a cross between the Shropshire and the Holderness has been established, by which increase of size has been obtained, hardihood, and a greater quantity of milk. They are very docile; and when red or spotted they are in great request: the spotted are accounted the most valuable.

The Third Duke of Cambridge. 5941.

Winner of the first prize for Short-Horn Bulls, at Syracuse, in 1849; and first prize at Albany, 1850. of the New York State Agricultural Society's Shows in those years. He was bred by Thomas Bates, Esq., Kirkleavington, England; and was imported by and

CHAPTER VII.

THE SHORT-HORNS.

This account of the Short-Horns is by the Rev. Henry Berry, than whom there were few more zealous breeders of cattle.

It must be admitted that the short-horns present themselves to notice under circumstances of peculiar interest. Possessing in an eminent degree qualities which have generally been considered incompatible, and attractive to the eye by their splendid frames and beautifully varied colors, it is not surprising that they have become objects of public curiosity; that they have realized for their breeders enormous sums; and that, in our own island, and in every foreign country where agriculture is attended to, they are in increasing demand.

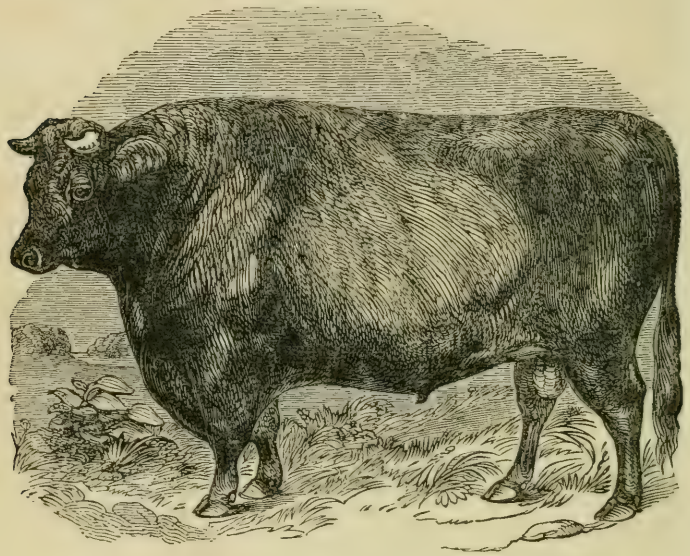
It might tend to throw much light on the science of breeding, could these animals be traced, in their improvement, to an earlier period than has been found possible.

From the earliest periods as to which we have any accounts of our breeds of cattle, the counties of Durham and York have been celebrated for their short-horns, but principally, in the first instance, on account of their reputation as extraordinary milkers.* It may be asserted, on the best evidence, that, as a breed, they have never in this particular been equaled. They were generally of large size, thin-skinned, sleek-haired, bad handlers, rather delicate in constitution, coarse in the offal, and strikingly defective in girth in the forequarters. As milkers, they were most excellent; but when put to fatten, were found slow feeders; producing an inferior meat, not marbled or mixed fat and lean, and in some cases the lean was found of a particularly dark hue.

A period of more than one hundred years has now elapsed since the short-horns, on the banks of the river Tees, hence called the Teeswater breed, had assumed a very different character to the fore-

* Before this a large and valuable description of cattle had existed on the western coast of the continent of Europe, and extending from Denmark to the confines of France. They were celebrated for the great quantities of milk which they yielded, and some of them exhibited an extraordinary aptitude to fatten. At what particular time they found their way to England, or by whom they were imported, is unknown; but there is a tradition that, towards the close of the seventeenth century, a bull and some cows were introduced into Holderness.—*Youatt.*

going description. In color, they resembled the short-horns of the present day, being occasionally red, red and white, and roan, though the last not then so prevalent as now. They possessed a fine mellow skin and flesh, good hair, and light offal, particularly wide carcasses, and fore-quarters of extraordinary depth and capacity. When slaughtered, their proof was extraordinary, and many instances are recorded of the wonderful weight of their inside fat.



AN OLD STYLE TEESWATER BULL.

The remarkable merit which existed in the Teeswater may, with propriety, be ascribed to a spirit of improvement which had some time manifested itself among the breeders on the banks of the Tees, whose laudable efforts were well seconded by the very superior land in the vicinity of that river. No doubt can be entertained that they proceeded on a judicious system of crossing with other breeds, because it was utterly impossible to raise such a stock as the Teeswater from pure short-horn blood. One cross to which they referred was, in all probability, the white wild breed; and if this conjecture be well-founded, it will be apparent whence the short-horns derived a color so prevalent among them.

It is also asserted that, about the period in question, Sir William St. Quintin, of Scampston, imported bulls and cows from Holland, which were crossed with the stock of the country. It would tend to

little advantage to conjecture as to what other breeds were resorted to, if any: this much is certain, that great improvement was soon manifested, and a valuable variety established, as the two following instances will prove.

Mr. Milbank, of Barmingham, bred and slaughtered an ox, which, at five years old, weighed four quarters, one hundred and fifty stones, (2114 lbs.) of fourteen pounds to the stone, producing sixteen stones of tallow; and a cow bred from his stock, slaughtered by Mr. Sharter, of Chilton, at twelve years old, weighed upwards of one hundred and ten stones. (1540 lbs.)

From Mr. Milbank's time, the Teeswater cattle continued to sustain their excellence and celebrity in various hands, until Mr. Charles Colling adopted them.

Whatever had been the merits of the Teeswater cattle, it is certain Mr. Colling greatly improved them; and though it has been asserted that his success was the result of chance, arising from the possession of an animal, with the merits of which he was at one period unacquainted, the writer of this article is of opinion that Mr. Colling's success resulted from a deliberate and well-considered plan. He found the Teeswater, like all other extravagantly large cattle, frequently of loose make and disproportion. He was sensible, also, of the difficulty of breeding, with anything like certainty, *large good* animals; and though he has declined on all occasions to throw any light on his views and proceedings, the writer thinks he can detect, in the very outset, and through the progress of his practice, a resolution to reduce the size of this breed, and at the same time, and by that means, to improve its form. This he is supposed to have effected, in the first instance, through the medium of a bull, called *Hubback*, an animal respecting which there has been much controversy, principally touching the purity of his blood, a question now of little importance, because it is admitted on all hands that Mr. Colling adopted another cross, which prevails in a majority of superior shorthorns of the present day. It may, notwithstanding, be matter of interest to state a few particulars respecting this bull.

Without entering on an inquiry by what circumstances Hubback's title to be considered of pure blood is supported or weakened, it may suffice to observe, that it appears probable he possessed on one side the imported blood. The possessor of his dam was a person in indigent circumstances, and grazed his cow in the highways. When afterwards she was removed to good land, near Darlington, she became so fat that she did not again breed; and her son, having the same feeding propensity in a high degree, was useful as a bull during a very short period. The quality of his flesh, hide, and hair are supposed to have been seldom equaled; and as he was smaller than the Teeswater cattle, he was eminently calculated to forward Mr.

Colling's views. There are no superior short-horns which do not claim descent nearly, or remotely, from Hubback.*

After the use of this bull, Mr. Charles Colling proceeded with success to produce superior animals; and the number of bulls he disposed of by letting was highly encouraging. But the circumstance which brought the short-horns into most extensive notice was the production of the Durham Ox, an animal which speaks volumes in favor of this blood. The ox was the produce of a cow which had been put to *Favorite*. At five years old, the Durham ox was sold to Mr. Bulmer, of Harmby, near Bedale, for public exhibition, for 140*l.* in February, 1801. He was at that time computed to weigh 168 stones, of 14 lb., (2352 lbs.), his live weight being 216 stones, (3024 lbs.) and this extraordinary weight did not arise from his superior size, but from the excessive ripeness of his points. Mr. Bulmer traveled with him five weeks, and then sold him and his carriage, at Rotherham, to Mr. John Day, on the 14th May, 1801, for 250*l.* On the 14th of May, Mr. Day could have sold him for 525*l.* On the 13th of June, for 1000*l.* On the 8th of July, for 2000*l.*

Mr. Day traveled with him nearly six years, through England and Scotland, till at Oxford, on the 19th February, 1807, the ox dislocated his hip-bone, and continued in that state till the 15th April, when he was obliged to be slaughtered, and, notwithstanding he must have lost considerably in weight, during these eight weeks of illness, his carcass weighed—Four quarters, 165 stones 12 lbs. (2322

* This is true, because Hubback was the sire of the dam of Mr. Charles Colling's bull, Foljambe, who was the grandsire of Favorite; and there has not been for many years any superior short-horn not descended from Favorite. Mr. Charles Colling is said to have considered that the bull, Foljambe, was the one who did his stock the greatest good; and this is not improbable, as Foljambe was the sire both of the sire and dam of Favorite. Hubback, however, must have been a remarkably good animal, and considering the short time during which he was used by Colling, proved himself a first-rate stock-getter.

The following account of Hubback we had from Mr. Waistell, of Alihill, who, although his name does not appear conspicuously in the Short-Horned Herd Book, deserves much credit for his discrimination here. He used to admire this bull as he rode by the meadow in which he grazed; and at length attempted to purchase him. The price asked, 8*l.*, seemed much, and the bargain was not struck. Still he longed for the beast; and happening to meet Mr. Robert Colling near the place, asked his opinion of the animal. Mr. Colling acknowledged that there were good points about him; but his manner induced Mr. Waistell to suspect that Mr. Colling thought more highly of the bull than his language expressed, and he hastened the next morning, concluded the bargain, and paid the money. He had scarcely done so before Mr. R. Colling arrived for the same purpose, and as the two farmers rode home together, they agreed that it should be a joint speculation.

Some months passed by, and either Mr. Waistell's admiration of the bull cooled, or his partner did not express himself very warmly about the excellences of the animal, and Messrs. Waistell and R. Colling transferred Hubback to Mr. C. Colling, who, with the quick eye of an experienced breeder, saw the value of the beast. Mr. Waistell expressed to us (October, 1832) his regret (natural enough) at having been induced to part with him, and his extreme disappointment that when Hubback began to cover, Mr. Charles Colling confined him to his own stock, and would not let him serve even one of Mr. Waistell's cows.—*Youatt.*

lbs.); Tallow, 11 stones 2 lbs. (156 lbs.); Hide, 10 stones 2lbs. (142 lbs.); total 2620 lbs.

This was his weight at eleven years old, under all the disadvantages of traveling in a jolting carriage, and eight weeks of painful illness. Had he been kept quietly at Ketton, and fed till seven years old, there is little doubt he would have weighed more than he did at ten years old, at which age his live weight was two hundred and seventy stones, (3780 lbs.) from which, if fifty be taken for offal, it leaves the weight of the carcass two hundred and twenty stones, (3080 lbs.)

It is a well-ascertained fact, that, during his career as a breeder, Mr. Colling tried several experiments in crossing, and the breeds to which he resorted on these occasions being very considerably smaller than the short-horns, this circumstance tends to corroborate the writer's opinion that he considered it desirable to reduce their size. The cross with the Kyloe led to no results worthy enumeration, but that with the *polled Galloway* must not be passed over without comment. Before stating the circumstances attending this experiment, it may be proper to observe that no breed of cattle promised so successful a cross with the short-horns as the Galloway. They were calculated, by their deep massive frames and short legs, to bring the short-horns nearer the ground, and to dispose their weight in a more compact manner: their hardy habits would be essentially useful, and the quality of their flesh and hair were such as to render the experiment still more safe, and they could be obtained of a red color; even without the sanction of a successful experiment, they were admirably adapted to cross with the short-horn, standing frequently too high from the ground, not very well ribbed home, and often of loose, disjointed frame.

To this breed Mr. Colling resolved to resort; and though at the time when he did so, the event was regarded with some degree of ridicule by the pure-blood advocates, and comments passed which would have deterred ordinary men from the exercise of their judgment, Mr. Colling persisted.

Mr. Colling's short-horned bull *Bolingbroke* was put to a beautiful red polled Galloway cow, and the produce, a bull-calf, was, in due time, put to *Johanna*, a pure short-horn—she also produced a bull-calf. This grandson of Bolingbroke was the sire of the cow, *Lady*, by another pure short-horned dam, and from Lady has sprung the highly valuable family of improved short-horns, termed, in reproach, the *alloy*. How far the alloy was derogatory, let *facts* testify.*

* The dam of Lady was Phœnix, also the dam of the bull Favorite; and as the grandson of Bolingbroke is not known to have been the sire of any other remarkably good animal, it is most probable that the unquestionable merit of Lady and her descendants is to be attributed more to her dam than to her sire.—*Youatt.*

Mr. Colling was favored by circumstances in his object, which was to take one cross, and then breed back to the short-horn—the only course in which crossing can be successfully adopted. To breed from the produce of a cross *directly among themselves* will lead to results believed conclusive against crossing; but to take one cross, and then return and adhere to one breed, will, in a few generations, stamp a variety with sufficient certainty.

It will probably be admitted that the prejudice against this cross was at the highest at the time of Mr. Charles Colling's sale. The blood had then been little, *if at all*, introduced to other stocks, and it was manifestly the interest, whatever might be the inclination, of the many breeders who had it not, to assume high ground for the pure blood, and to depreciate the alloy. Under these untoward circumstances for the alloy, what said public opinion, unequivocally certified by the stroke of the auctioneer's hammer? *Lady*, at fourteen years old, sold for two hundred and six guineas. *Countess*, her daughter, nine years old, for four hundred guineas. *Laura*, another daughter, four years old, for two hundred and ten guineas. *Major* and *George*, two of her sons, the former three years old, the latter a calf, for two hundred guineas, and one hundred and thirty; besides a number of others, more remotely descended from Lady, which all sold at high prices. Lady and her descendants sold for a larger sum than any other family obtained.

A Catalogue of Mr. C. Colling's Sale of Short-Horned Cattle, October 11th, 1810.

COWS.

Age.	Names.	Out of.	Got by.	Sold for. Gs	Bought by.
11,	Cherry,	Old Cherry,	Favorite,	83,	J. D. Nesham.
4,	Kate,		Comet,	35,	Mr. Hunt.
5,	Peeress,	Cherry,	Favorite,	170,	Major Rudd.
2,	Countess,	Lady,	Cupid,	400,	Do.
5,	Celina,	Countess,	Favorite,	200,	Sir H. Ibbetson.
4,	Johanna,	Johanna,	Do.,	130,	H. Witham.
14,	Lady,	Old Phœnix,	A grandson of Lord Bolingbroke.	206,	C. Wright.
8,	Catheline,	A daughter of the dam of Phœnix,	Washington,	150,	G. Parker.
4,	Laura,	Lady,	Favorite,	210,	Mr. Grant
3,	Lily,	Daisy,	Comet,	410,	Major Rudd.
6,	Daisy,	Old Daisy,	A grandson of Favorite,	140,	Major Bower.
4,	Cora,	Countess,	Favorite,	70,	G. Johnson.
4,	Beauty,	Miss Washington,	Marske,	120,	C. Wright.
4,	Red Rose,	Eliza,	Comet,	45,	W. C. Fenton.
3,	Flora,		Do.,	70,	Earl of Lonsdale.
3,	Miss Peggy,		A son of Favorite,	60,	O. Gascoigne.
3,	Magdelene,	A heifer by Washton,	Comet,	170,	—— Champion.
				2669,	

BULLS.

Age.	Names.	Out of.	Got by.	Price. Gs.	Bought by.
6,	Comet,	Phœnix,	Favorite,	1000.	Messrs. Wetherell, Trotter, Wright, and Charge.
9,	Yarborough,		Do.,	55,	A Gregson
3,	Major,	Lady,	Comet,	200,	Mr. Grant.
3,	Mayduke,	Cherry,	Do.,	145,	Mr. Smithson.
2,	Petrarch,	Old Venus,	Do.,	365,	Major Rudd.
2,	Northumberland,		Do.,	80,	Mr. Buston.
1,	Alfred,	Venus,	Do.,	110,	Mr. Robinson.
1,	Duke,	Duchess,	Do.,	105,	A. Compton.
1,	Alexander,	Cora,	Do.,	63,	Mr. Fenton.
1,	Ossian,	Magdalene,	Do.,	76,	Earl of Lonsdale.
1,	Harold,	Red Rose,	Windsor,	50,	Sir C. Loraine,
				2249.	

BULL-CALVES, UNDER ONE YEAR OLD.

Names.	Out of.	Got by.	Price. Gs.	Bought by.
Ketton,	Cherry,	Comet,	50,	Major Bower.
Young Favorite,	Countess,	Do.,	140,	—— Skipworth.
George,	Lady,	Do.,	130,	Mr. Walker.
Sir Dimple,	Daisy,	Do.,	90,	T. Lax.
Narcissus,	Flora,	Do.,	15,	Mr. Wright.
Albion,	Beauty,	Do.,	60,	T. Booth.
Cecil,	Peeress,	Do.,	170,	H. Strickland.
			665.	

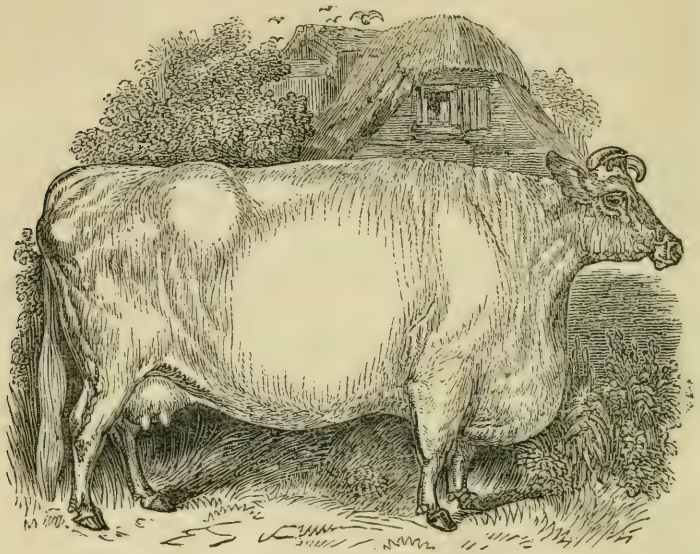
HEIFERS.

Age.	Names.	Out of.	Got by.	Price. Gs.	Bought by
3,	Phœbe,	Dam by Favorite,	Comet,	105,	Sir H. Ibbetson.
2,	Duchess I.,	Do.	Do.,	183,	T. Bates.
2,	Young Laura,	Laura,	Do.,	101,	Earl of Lonsdale.
2,	Young Countess,	Countess,	Do.,	206,	Sir H. Ibbetson.
2,	Lucy,	Dam by Washington,	Do.,	132,	Mr. Wright.
1,	Charlotte,	Catheline,	Do.,	136,	R. Colling.
1,	Johanna,	Johanna,	Do.,	35,	G. Johnson.
				808	

HEIFER-CALVES, UNDER ONE YEAR OLD.

Names.	Out of.	Got by.	Price. Gs.	Bought by.
Lucilla,	Laura,	Comet,	106,	Mr. Grant.
Calista,	Cora,	Do.,	50	Sir H. V. Tempest.
White Rose,	Lily,	Yarbro',	75,	Mr. Strickland.
Ruby,	Red Rose,	Do.,	50,	Major Bower.
Cowslip,		Comet,	25,	Earl of Lonsdale.
			306.	

From the above it appears that seventeen cows were sold for £2802 9s.; eleven bulls, £2361 9s.; seven bull-calves, £687 15s.; seven heifers, £942 18s.; five heifer-calves, £321 6s. In all forty-seven were sold, for £7115 17s.



THE REV. H. BERRY'S COW.

Mr. Charge of Newton, near Darlington, and Mr. Mason of Chilton, in the county of Durham, were only second to Mr. Charles Colling in his interesting and useful pursuit. Mr. Mason started early with animals derived, it is believed, from Mr. Colling, in the very commencement of his career; and Mr. Charge, who had long possessed a most valuable stock of Teeswater cattle, had at an early period crossed them with Mr. Colling's best bulls, and was one of the spirited purchasers of Comet, at a thousand guineas. Mr. Mason's successful sale sufficiently stamps the value of his stock at that period, 1829.

It would be unfair to omit mention of a veteran breeder, to whom the advocates for the preservation of pedigree are indebted for the "Short-horn Herd Book"—Mr. George Coates. He is now one of the oldest authorities on the subject, and was once the possessor of a very superior race of short-horns, though somewhat coarse. Portraits have been preserved of some very good animals bred by

him ; and he had the satisfaction to dispose of his bull *Patriot* for five hundred guineas.

Mr. Coates fell into an error, but too common, and generally equally fatal : he fancied his own stock the best, and disdained to cross them with Mr. Colling's ; which, as others afterwards proved, would have been a most judicious proceeding. The consequence was, Mr. Colling's sale having settled the public judgment and taste, Mr. Coates's stock fell into disrepute. If an apology be requisite for this statement of an undeniable fact, it will be found in the utility of holding up such an example as a caution to those who may be in danger of falling into a similar error.

It is considered that the specimens already appealed to, and the fine animals whose portraits accompany this account, will render superfluous any attempt more particularly to describe the short-horns. Of course they will be found to vary greatly ; but sufficient may be collected from what is presented to the reader, to inform him as to the character of this superior breed of cattle. The next object, then, will be to show their capabilities to make a return for food consumed, and the unparalleled early period at which such return may be made. Indeed, *early maturity* is the grand and elevating characteristic of the short-horns, and their capacity to continue growing, and at the same time attaining an unexampled ripeness of condition at an early age, has excited the wonder, and obtained the approbation, of all not blinded by prejudice.

In order to do justice to the subject, and to show that these properties are not all of recent acquirement, but were possessed in an eminent degree by the Teeswater cattle, it will be requisite to give a few facts in evidence.

Sir Henry Grey (of Howick) bred two oxen, which were fed by Mr. Waistell, and when six years old weighed 130 stones each, 14 lbs. to the stone (1820 lbs.) ; their inside fat being extraordinary.

A heifer, three years old, bred by Miss Allen (of Grange), fed on hay and grass alone, weighed 90 stones, (1360 lbs.)

Two three years'-old steers, bred by the same lady, and similarly fed, weighed respectively 92 and 96 stones, (1288 lbs. and 1344 lbs.)

Mr. Waistell's four years'-old ox, by the grand-sire of Hubback, weighed 110 stones, (1540 lbs.)

A four years'-old ox, bred by Mr. Simpson (of Aycliffe,) fed on hay and turnips only, weighed 135 stones, (1890 lbs.)

A five years'-old heifer, bred by a bishop of Durham, weighed 110 stones, (1540 lbs.)

A cow of Mr. Hill's, slaughtered in Northumberland, weighed 127 stones, (1738 lbs.)

Mr. George Coates, before-mentioned, slaughtered a heifer, by the sire of Hubback, which, fed on turnips and hay, weighed, at two years and two months old, 68 stones, (932 lbs.)

An ox and heifer, bred by Mr. Watson (of Manfield,) weighed, at four years old, within a few pounds, 110 stones each, (1540 lbs.)

A sister to Mr. G. Coates's *Badsworth*, having run with her dam, without oil-cake or meal, met with an accident, and died when seven months old; she weighed 34 stones, (476 lbs.)

A steer, by a brother to the above heifer, three years and two months old, weighed 105 stones (1470 lbs.); and another steer, by the same bull, exactly three years old, weighed 95 stones, (1330 lbs.) Both were kept as store-beasts till two years old.

An ox, bred by M. Hill (of Blackwell,) slaughtered at six years old, weighed 151 stones, 10 lbs. (2124 lbs.); tallow, 11 stones.

The Howick red ox, seven years old, weighed 152 stones, 9 lbs., (2137 lbs.); tallow, 16 stones, 7 lbs.

Mr. Charge's ox, seven years old, weighed 168 stones, 10 lbs. (2352 lbs.); tallow, 13 stones.

The foregoing instances of weight and proof show, that in the Teeswater cattle, Mr. Charles Collins had good materials with which to commence. Let us now refer to a later period, and state some particulars respecting their descendants, the short-horns.

In the year 1808, Mr. Bailey, the agricultural historian of Durham, informs us, he saw, at Mr. Mason's (of Chilton,) a cow, not less remarkable in point of fat than the Durham ox. At that time, the depth of fat, from the rump to the hips, in a perpendicular position, was not less than twelve inches; and the shoulder score at least nine inches thick.

Mr. Robert Colling's heifer, which was exhibited as a curiosity, was estimated, at four years old, to weigh 130 stones, (1820 lbs.)

The same gentleman sold, in Darlington Market, on the 18th of April, 1808, a two years'-old steer for 22*l.*; the price of fat stock being at that time seven shillings per stone; 66 stones 6 lbs. weight, or 924 lbs.

At Mr. Nesham's (of Houghton-le-Spring,) Mr. Bailey saw a steer, 25 months old, completely covered with fat over the whole carcass, and supposed to be the fattest steer of his age ever seen. Butchers estimated him to weigh 75 stones, (1050 lbs.) Neither of the last-mentioned were of large size, and would not have weighed above 40 stones (560 lbs.), had they been no fatter than those usually slaughtered.

Mr. Wetherell (of Field House) sold at the fair in Darlington, in March, 1810, two steers, under three years old, for 47*l.* 10*s.* each. The price of cattle at that fair, 10*s.* per stone; weight 1330 lbs. each.

Mr. Arrowsmith (of Ferryhill,) who fed off his short-horns at two years old, furnished the following particulars of the prices he obtained from the butchers, viz.

In 1801, sold four for 25*l.* each; two steers, and two heifers. In 1802, sold six for 17*l.* 10*s.* each; three steers, and three heifers. In

1803, sold four for 17*l.* each. In 1804, sold six for 18*l.* 10*s.* each. In 1805, sold six for 17*l.* 10*s.* each; two steers, and four heifers. In 1806, sold four for 16*l.* each. In 1807, sold eight for 18*l.* each. In 1808, sold eight for 19*l.* each.

The time of selling, from the beginning to the latter end of May. In the first winter they got straw in a fold-yard, with nearly as many turnips as they could consume; in May they went to grass; in November put to turnips through the winter, and turned to grass the first week in May.

A twin heifer, belonging to Mr. Arrowsmith, calved the last week in April, being kept the first year as the store-stock, was entered for a sweepstakes, to be shown in June, at which time she would be two years old. She was immediately turned to grass. In November she was estimated to weigh 28 stones (392 lbs); when she was put to ruta baga, and hay, and oil-cake, of which latter she ate 4 cwt., with 2 bushels bean-meal, and 1 bushel barley. She went to grass again on the first of May, and from that period had neither oil-cake nor meal. On the 23d of July, it was the opinion of judges that she weighed 58 or 60 stones (820 lbs.); having gained 30 stones (420 lbs.) in 30 weeks.

In April, 1808, Mr. Bailey saw, at Mr. Arrowsmith's, eight yearlings, intended for feeding. They were *very lean*, not more than 15 stones (210 lbs.) each; and had they been offered for sale in a fair, no person, unacquainted with the breed, would have given more for them than 4*l.* 10*s.* or 5*l.* per head.

Mr. Walton (of Middleton in Teesdale) had been, in 1808, in the habit of selling his steers, at two years and a quarter old, at from 20*l.* to 30*l.* each; their weight being 50 to 54 stones (700 to 750 lbs.) fed solely on vegetable food.

Mr. Mason (of Chilton,) in an experiment to ascertain the weight of beef gained by the food given (turnips,) found three steers, under three years old, to have gained 20 stones (280 lbs.) each in 20 weeks. The three steers averaged 70 stones (980 lbs.) each.

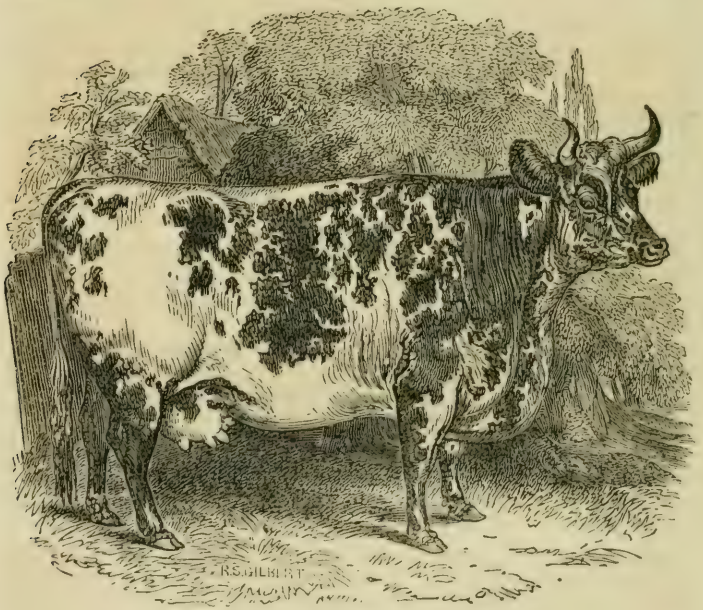
In 1816, Mr. Nesham's steer, three years and a half old, obtained the premium offered by the Durham Agricultural Society; his weight was, the 4 quarters, 96 stones, 1½ lbs. (1347½); tallow, 11 stones, 7 lbs. (154 lbs.); hide, 8 stones, (112 lbs.)

Major Rudd (of Cleveland) obtained the premium offered by the Cleveland Agricultural Society in 1811, for the best steer, under three years old, and fed on vegetable food. The steer was slaughtered when three years and thirteen days old; the weight of his four quarters was 96 stones, (1344 lbs.)

The late Mr. Robertson, of Berwick-upon-Tweed, furnished the following particulars of short-horns, bred by him, and fed, with few exceptions, on vegetable food:—

1794.—An ox, four years ten months old; four quarters, 145

stones, 3 lb.; tallow, 24 stones, 7 lb., (2208 lbs.) A steer, under four years old; four quarters, 106 stones; tallow 19 stones, 7 lb., (1747 lbs.,) 1814.—A steer, three years nine months old; four quarters, 101 stones, tallow, 15 stones, (1624 lbs.) 1815.—A steer, three years eleven months old; four quarters, 112 stones 7 lb.; tallow, 26 stones, (1839 lbs.) A heifer, three years eight months old; four quarters, 89 stones, (1226 lbs.) 1817.—A steer, three years two months old; four quarters, 95 stones, 10 lb.; tallow, 17 stones, 10 lb. (1528 lbs.) 1822.—An ox, four years and a half old; four quarters, 135 stones; tallow, 21 stones, (2184 lbs.) Own brother to the foregoing, three years and a half old; four quarters, 133 stones; tallow, 21 stones, (2170 lbs.) A steer, three years ten months old; four quarters, 124 stones; tallow, 17 stones, (2074 lbs.) A steer, three years eight months old; four quarters, 112 stones, (1568 lbs.); tallow not weighed.



LORD ALTHORP'S COW.

A steer, bred by Col. Cook, of Doncaster, fed on potatoes and straw, was slaughtered when two years and twenty-two days old; his four quarters weighed 72 stones, (1008 lbs.)

Mr. John Rennie (of Phantassie,) fed, in 1823, a steer, from eigh-

teen to twenty months old; the four quarters of which weighed 945 lbs.

The same gentleman fed a steer, aged two years four months, whose four quarters weighed 1231 lbs.; also a steer, aged three years six months, whose four quarters weighed 1369 lbs.; tallow, 241 lbs.

Should the foregoing statement be considered extended, it will, at least, be admitted, that its ample detail establishes the credit of the short-horns as an invaluable breed to the grazier.

In the commencement of this account, however, it was stated that they possess a combination of qualities, considered incompatible in other breeds, viz., the disposition to feed rapidly, in union with dairy qualifications.

LORD ALTHORP'S HEIFER.

There is a very general impression that animals disposed to fatten rapidly seldom give much milk. It is true, that every perfection in cattle—whether it be one of form, of quality of flesh, of disposition to fatten, or to yield milk—can be promoted and retained solely by the breeder's devoted attention to his particular object; and if one object be allowed a paramount importance in the breeder's practice, other objects will suffer, in proportion as they are neglected.

The carcass of the short-horns has ever been so surprising, and so

justly valued, that many persons have allowed that completely to occupy their attention, and the dairy has been disregarded. In such a state of things, every advance towards one point has been to recede from another; because what tends to enhance a particular quality, will also enhance a defect, provided such defect was of previous existence.

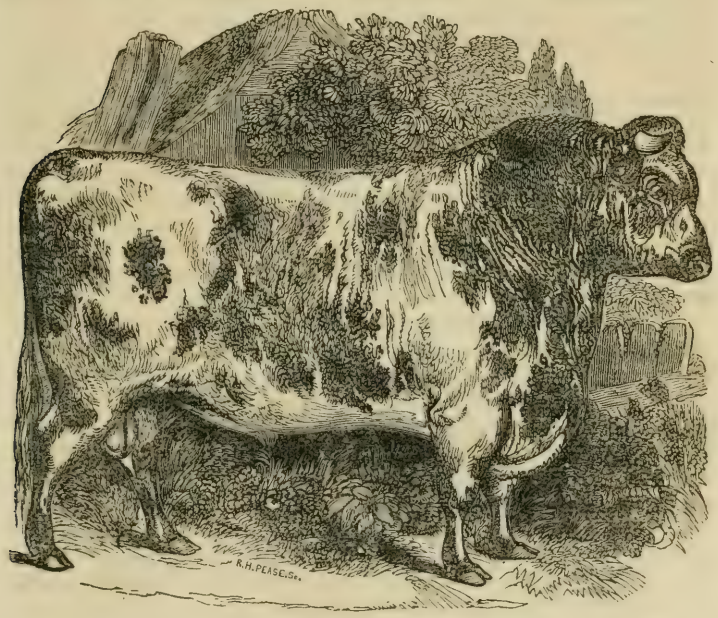
The objections which exist among breeders, for various and some cogent reasons, against crossing with the stocks of each other, unavoidably lead to the practice of breeding in and in; which, in case of any original deficiency of the milking property, must unquestionably go on to render that deficiency greater. Bad milking, in a breed of animals which were ever distinguished as good milkers, is not a necessary consequence of improvement in the animal in other respects, but a consequence of the *manner* in which such improvement is pursued. Short-horns, inferior to none for the grazier, may always be selected and bred with the most valuable dairy properties. There are many instances of the highest bred short-horns giving upwards of four gallons of milk night and morning; and attention only is requisite, on the part of the breeder, to perpetuate this quality to any desirable extent. A moderately good milker will be found to yield as much *butter* in the week as one giving an enormous quantity; the milk being unquestionably of very superior quality; and, indeed, it should be the case, that the animal economy, which leads to an excessive secretion of flesh and fat, should also be productive of other rich secretions.

Wherever the improved short-horns have been crossed with other cattle, their superiority is equally manifest, in respect of dairy qualifications, as in every other.

An opinion generally prevails that the short-horns are unfitted for work; and in some respects it is admitted they are so: but the correct reason has not been assigned, and the question may fairly come briefly under notice. They are willing and able to work, but surely cattle which, as the preceding account proves, will go as profitably to the butcher at two years old as any other breed at three, and as many even at four, ought never to be placed in the yoke. No beast, in the present advanced state of breeding, ought to be put upon a system which arose out of the necessity of obtaining compensation by work for the loss attending a tardy maturity. But where it may be convenient, the short-horns, particularly the bulls, work admirably, as their great docility promises: And as good bulls are apt to become useless, from acquiring too much flesh in a state of confinement, moderate work might, in most cases, prove beneficial.

The specimens which accompany this account will render little comment necessary on their form. With deference, however, it is submitted to the breeders of short-horns, that they should avoid

breeding from too close affinities, and, while they steer clear of coarseness, should require a sufficiency of *masculine* character in their males. This is a point in which many short-horns are rather defective, and it is one of infinite importance. The length of the carcass should be medium, as well as that of the legs, and a hardier animal, with equal size and on a more profitable scale, will be produced. The facilities for making this improvement are sufficiently numerous, the short-horns being now more generally diffused. That wider diffusion also multiplies the means of selecting for milk; a quality which should not be lost sight of; for it is the *combination* of perfections which has conferred, and will perpetuate, the superiority of this breed of cattle.



LORD ALTHORP'S BULL.

The colors of the short-horns are red or white, or a mixture of the two, combining in endless variety, and producing, very frequently, most brilliant effect. The white, it is very probable, they obtained from an early cross with the wild breed; and whenever this color shows itself, it is accompanied, more or less, with a red tinge on the extremity of the ear; a distinctive character, also, of the wild cattle. No *pure short-horns* are found of any colors but those above named.

"So far Mr. Berry, whose admirable account of the short-horns our readers will duly estimate." Thus Mr. Youatt finishes Mr. Berry's, and commences his part of the account of short-horns, which begins on page 131, and goes to page 137.

CORRECTIONS OF MR. BERRY, AND FURTHER HISTORICAL NOTICES OF SHORT-HORNS.

The American Editor deemed it proper to give the account of the short-horns written for this work by Mr. Berry, and printed by Youatt. It is to be regretted that Mr. Youatt should not have done in reference to the short-horns, what he did in reference to all the other races of English cattle,—written their history himself. Although adopting and therefore endorsing this history, he yet, in two quite important notes, pages 95 and 99, very materially qualifies one position, and wholly contradicts and destroys another most important one of Mr. Berry. Entirely unconnected with any particular stock or short-horn interest, Mr. Youatt was eminently fitted from capacity and impartiality to investigate, and then to write the history of the short-horns; and in this respect presents a strong contrast to Mr. Berry, who, from interest, was a partisan, and devoted to views sustaining that interest.

In England, it is said that Mr. Berry's *first* history, printed in 1824, and reprinted in 1830, was written to further the interest of Mr. Whittaker, then a breeder; and certain it is that the only breeder of that day—1824 to 1830—who finds a place in *that* history, is Mr. Whittaker. It is further said that Mr. Berry became hostile to Mr. Whittaker; that under this feeling of enmity, his *second* history (the one here given) was written, in which not the most distant allusion is made to Mr. Whittaker, or his stock; and that in this second history his object was to serve himself, as in the first one he had served Mr. Whittaker. Be this as it may, it is given as told.

No one would have a right to complain that the interest of Mr. Whittaker was promoted by the first history; or that of Mr. Berry by the second, had truth been observed and made the means of that advancement.

In the *first* of these histories, the object seems to have been solely to put forth Mr. Charles Colling as the *entire creator* of the short-horns in the great perfection they presented in his day, and exhibit at present; and Mr. Whittaker as his chief successor. In the *second* history (the one in Youatt) the object appears to be the same as regards Mr. C. Colling, and to show that the short-horn and Galloway *alloy*, or cross, is superior to the true short-horn. In this second one Mr. Berry's interest was to be promoted, as he had a large stock, wholly of the Galloway *alloy*.

In Mr. Berry's first history, there is much matter that is omitted in the second; and much in the second not to be found in the first; and much in each that is discordant with the other. In the first one the Galloway alloy is not named at all; in the second that cross is all that is held of any importance in the breeding of C. Colling.

The points in Mr. Berry's account, here printed, (his second history,) which will be noticed and refuted, are

1. The *asserted* importation of cattle from Holland about one hundred years since, *and the union of their blood* with the *then* existing short-horns of the valley of the Tees.

2. The assertion that about one hundred years since, the breeders of short-horns, in their pretended improvement, "proceeded on a judicious system of crossing with other breeds, and one to which they referred was in all probability the white wild breed."

3. The claimed exclusive improvement effected in the Short-horns by C. Colling.

4. The assertion that Mr. C. Colling adopted, as the rule of his breeding, the reduction of the size of the short-horns bred by him.

5. The account given of Hubback, in which it is impliedly said that he was not a pure short-horn, and that he possessed on one side the Dutch blood, and that from fat he early became useless.

6. The whole account of the Galloway cross; the value of that cross in consequence of the Galloway blood, and the assertion that the cross was made deliberately and with a view to the improvement of the short-horns.

1. There was no importation of Dutch cattle, from Holland.

Mr. Youatt in a note, page 95, says: "a large and valuable description of cattle existed on the western coast of the continent of Europe, and extending from Denmark to France. They were celebrated for the great quantities of milk which they yielded, and some of them exhibited an extraordinary aptitude to fatten. At what particular time they found their way to England, or by whom imported, is unknown."

Mr. George Culley, who wrote in 1785, says: "I remember a gentleman of the county of Durham, (a Mr. Michael Dobison,) who went in the early part of his life into Holland, in order to buy bulls; and those he brought over, I have been told, did much service in improving the breed; and this Mr. Dobison, and his neighbors even in my day, were noted for having the best breeds of short-horned cattle, and sold their bulls and heifers for very great prices. But afterwards some other people of less knowledge going over, brought home some bulls, that in all probability introduced into that coast the disagreeable kind of cattle well known to the breeders upon the river Tees, and called lyery, or double leyered, that is, black fleshed; and the flesh, (for it does not deserve to be called beef,) is black and coarse grained as horse flesh."

Mr. Berry, in his *first* history (of 1824), says *positively*, that "Sir William St. Quintin, of Scampston, imported cows and bulls from Holland." In his *second*, (page 96 of this volume,) he *qualifies* this *positive* assertion to the following, viz.: "*it is asserted* that about the period in question (1740) Sir William St. Quintin, of Scampston, imported bulls and cows from Holland."

Mr. Bailey, in his Agricultural Survey of Durham, says: "an attempt to improve the Teeswater breed (which I suppose was more with regard to size than any other quality,) was made by Mr. Michael Dobison, of the Isle, near Sedgefield, who brought a bull out of Holland, that is said to have improved the breed. A few years after, some other adventurers went over to Holland, and as *great bulls* were then considered the criterion of perfection, they brought home a complete lyery animal with immense buttocks, which did a great deal of mischief; but there were some intelligent breeders that steered clear of this evil; and from them the pure Teeswater breed has descended to the present time."

All the authorities for importations of Dutch cattle from Holland to England, last century, have here been quoted. Mr. Youatt had obviously investigated this point, and he says: "At what particular time they found their way to England, or by whom they were imported, is unknown; but *there is a tradition*, that towards the close of the seventeeth century, (prior to 1700,) a bull and some cows were introduced into Holderness." *He does not mention Michael Dobison.* Mr. Berry states that "*it is asserted* that Sir William St. Quintin, of Scampston, (which is in Holderness, Yorkshire,) imported bulls and cows from Holland;" but *he does not mention Dobison in either* of his histories. Mr. Culley states: "I remember a Michael Dobison, who went in the early part of his life into Holland, to buy bulls, and I have *been told* these bulls did much service in improving the breed." Martin, in his history of cattle, says, "by what crosses the Teeswater strain became established, it is scarcely possible to say; *there is*, we believe, *some reason* for thinking that one was with the semi-wild white breed, and another with choice cattle, imported directly from Holland." Martin, one of the scientific officers of the Zoological Society of London, is distinguished for his extended research in the department of the history of cattle. Both Martin and Youatt *quote* Culley; and neither *gives any credit* to the assertion that Dobison imported bulls from Holland. Bailey, in his Survey of Durham, gives it little or no credit, saying that *it is said* that Dobison's bull improved the breed; and yet Bailey distinctly states *his* belief that Dobison's attempt to improve the Teeswater cattle was *more* with regard to *size* than *any other quality.*

The elder Mr. Colling, father of Charles and Robert Colling, was contemporaneous with Dobison, and lived within five miles of him. Mr. Culley was born in 1735, at Denton, within fifteen miles of Dobi-

son, and resided at Denton until he was thirty-two years old, and knew Dobison personally. Mr. Bailey knew both Mr. Colling, Sen., and Mr. Culley. Bailey began his investigations in 1795, and Culley wrote in 1785. Mr. Bailey names Thomas Corner, who was ninety years old at the time, as his authority for saying that "Mr. Milbank, of Birmingham, and Mr. Croft, of Barford, were the most eminent breeders, and were considered as having the best and purest breed, at that period;" "and *Mr. George Culley says that he has repeatedly heard his father state the same particulars.*" Can there be a doubt that Mr. Bailey and Mr. Culley, had ample means to know every particular as to Mr. Dobison? and they communicate nothing. They record a tradition, and do no more. This *floating* tradition of an importation, found a resting place in Holderness, with St. Quintin; and in Durham, with Dobison.

It was about 1750 that Dobison lived at the Isle, and was breeding. Bailey fixes this period.

Now, at the period, at which it is said there were bulls and cows imported from Holland by Dobison, Sir William St. Quintin, and others, there existed a statute of Parliament, forbidding the importation of cattle into England.

In the 18th year of the reign of Charles II., which was the year 1666, the Parliament of England passed an act providing as follows:

"The Importation of all great Cattle shall be deemed a common Nuisance. If any (except for the necessary provision of the Ship,) shall be imported from beyond Sea, any Constable, Churchwarden, &c., of the place, may seize the same, and if the owner shall not within forty-eight hours, prove such Cattle were not imported, the same to be forfeited."

And to this were added penalties against the importer. From that time until the year 1841, that act was *unrepealed*, and was *always enforced*, except from 1801 to 1814.

By a statute of Parliament made in the 39th year of the reign of George III., (which was the year 1799,) it was enacted that "a discretionary power is hereby vested in His Majesty, to permit from Time to Time, the Importation of all Articles of Provisions; Bulls, Cows, Calves, Oxen, Sheep, Lambs, and Swine."

And by order in Council, made in 1801, it was directed that "A free Importation of Articles of Provisions, Cattle, Sheep, and Swine, be permitted for six months, from the date of this order;" and like orders from six months to six months were made in Council from 1801 to the latter part of the year 1814, when they ceased. Excepting this period, from 1801 to 1814, the importation of cattle was prohibited altogether from 1666 to 1841. The king and his council had no power to permit importation until the act of Parliament in 1799 was passed.

Mr. John Hutchinson, the well-known banker of Stockton, county

of Durham, and breeder of short-horns, had an examination made of the records of the various ports in his vicinity, viz., New-Castle, Sunderland, and Stockton, and found that no cattle from 1666 to 1821 had ever been imported at any time into Stockton, and into New-Castle and Sunderland, *only* during the period of permission from 1801 to 1814. In his history and pedigrees of *his own* short-horns, he states these examinations, and denying an importation of Dutch cattle, by Dobison, says: "I should like to know when Michael Dobison of the Isle took his trip to Holland, to select bulls to improve the breed? Nay, I will not be very particular, only let me know in what *king's reign* it was, and I shall be satisfied. Thus it appears that all that has been written about these importations of Dutch animals is not to be depended on." Mr. J. Hutchinson, and his brother, were contemporaneous with the Collings; and their uncle, who died in 1789, and whose stock they inherited, was contemporaneous with Dobison.

In addition to this, the late Mr. Thomas Bates, of Kirkleavington, Eng., was informed by Mr. Christopher Hill, collector of the port of Sunderland, that he had made an examination by correspondence with the various collector of the ports on the eastern coast of England, from Berwick in Scotland, to London, and that the records of the customs in those ports furnished no proof of the importation of any cattle rom 1666 to 1796. Mr. Christopher Hill was the last of the family of that name, distinguished as breeders of short-horns at Blackwell. He parted with his stock entirely in 1790, and was in 1794 appointed collector of the port of Sunderland.

With all this evidence, who for a moment can believe in the importation, some time in the last century, of Dutch cattle to the county of Durham, and their being used to improve the short-horns. The Mr. Milbank of 1740, of Barningham, first mentioned by Mr. Bailey, was prior in point of time to Mr. Dobison, and there is no pretence that any Dutch cattle were imported until Dobison's time. Sir William St. Quintin was breeding about 1760 to 1780, subsequently to Mr. Dobison, and died in 1795. Of course Mr. Milbank could have had no Dutch blood in his cattle; and Mr. Baily expressly mentions him, and Mr. Croft of Barford, as among those "intelligent breeders that steered clear of this evil, [the Dutch blood,] and from them the *pure* Teeswater breed has descended to the present time." The other breeders of that period who were noted with Milbank and Croft, were Mr. Brown and Mr. Appleby, of Aldborough, Mr. Best, and Mr. Watson of Mansfield; Mr. Waistel, of Great Burdon; Mr. Stephenson, of Ketton; Mr. Harrison, of Barmpton; Mr. John Hall, of Haughton Hill; Mr. Sharter of Chilton; Mr. Pickering, of Foxton; and Mr. Bamlet, of Norton. These are named particularly, as from the herds of every one of them, Charles and Robert Colling derived animals, either directly, or from intermediate breeders.

Suppose we admit that St. Quintin, and Dobison and his successors, imported Dutch cattle. Both Culley and Bailey say that Dobison and his successors brought *only bulls* from Holland; and the one says that "*it is said*," and the other that "*I have been told*," that the Dutch bull of Dobison did good; both say that the other Dutch bulls did harm; and Bailey says that "*there were some intelligent breeders who steered clear of this evil, and from them the pure Tees-water breed has descended to the present time.*" Then it was only from Dobison's *bull* that the Dutch blood could get into the short-horns; the race of short-horns was there before that bull came, *for Dobison and his fellow importers brought no cows from Holland.* The only person who is said to have imported *cows* as well as *bulls* from Holland, was Sir William St. Quintin. It is said that Sir James Pennyman got his cattle from St. Quintin, and that he gave a bull and cows to George Snowdon; that, Snowdon's bull having the Dutch blood, of course Hubback had it, as Hubback was by Snowdon's bull; that Hubback's blood is in all well descended (perhaps all) short-horns, therefore the Dutch blood is in all short-horns. But *it is not the fact* that Pennyman gave a bull and cows to Snowden; nor is there any evidence to show that Snowdon's bull and cows were of Pennyman's blood. This will be shown under the head of remarks on Hubback's pedigree. Then the Dutch blood, that is now to be deemed a part of the blood of short-horns, must all come from Dobison's bull. In the days of the Collings it must have been reduced to at most a one thousandth part; what part must it be now? Decimal fractions could hardly compute it. If the short-horns have it, they cannot be good in consequence of it, for it is too incalculably small to have the least influence. But the statute of Charles II. cuts off all chance for even this infinitesmal decimal of Dutch blood in short-horns.

There can be no doubt that *originally* the short-horns came from the continent. But it was many hundred years since, though at what time no one can say. It is not claimed by any one that they were imported in the last century; only that they were improved by *bulls* imported from Holland. Culley says, "in all the accounts of cattle in this island, which I have seen in deeds or statutes, they are called black cattle. Now, does this not strengthen the opinion of the short-horned breeds being introduced from the continent, *sometime after our sea-coasts and low country were improved and inclosed;* and before that period, is it not probable we had mostly the small black cattle, which are still to be met with in all the wild mountainous parts of Wales and Scotland?" Again he says, "it is pretty evident that our *forefathers* have imported the short-horned breed of cattle from the continent." Berry, in his *first* history (of 1824) says "there exists *authentic* evidence of facts, which place the short-horns *on a level, at least*, with any of their rivals, *howsoever high the*

antiquity they boast." Martin says, "In Groningen, Friesland, Guilderland, Utrecht, and Holland, a fine short-horned race of cattle has long existed. This ancient short-horn race may in fact be traced from Jutland and Holstein (both in Denmark), along the western portions of Europe, through the Netherlands (Holland and Belgium), to the borders of France. In reference to *our* (the English) short-horned breed, Mr. Culley says 'there are many reasons for thinking this breed has been imported from the continent.'"

The great argument, however, for the continental origin is, undoubtedly, that the short-horns, a local breed in four counties only of England, had no congener or allied breed elsewhere in England, but found it only on the continent, from Denmark to Belgium. The Danes ravaged all the region from Denmark to France, for more than one hundred years, from 850 to 950, and in 875 conquered the kingdom of Northumbria, which comprised the counties of Yorkshire, Durham, and Northumberland, in England, and held it, either independently or by paying tribute, for nearly two hundred years, and until subjected and incorporated with England, as one kingdom, by William the Conqueror. At what time the short-horns were brought to these Danish counties in England, is unknown; but it is probable as many as seven or eight centuries since. There is a cow sculptured on the west corner tower of the eastern transept of the cathedral of the city of Durham, commemorating a tradition as to the cathedral; *and in every respect the effigy presents a short-horned cow.* This transept was begun to be built in the year 1235, and was finished by Prior Hotoun about 1300, he dying in 1308.

But it is conceded by all authorities that the short-horns have existed for ages in Durham; the *question* is *what* were the means used to improve them up to their present perfection. Some say by selections among the race itself; others claim that bulls were imported from Holland, and crossed on them; that the white wild breed of Chillingham and Chatelherault (Cadyow) Parks, and even the Alderneys, were used. As to the Alderney, it may be remarked that *not one* of the *historians* of English cattle, Culley, Berry, Martin, Youatt, mentions this cross, and therefore it is not worth refutation. As to the cross with the white wild breed, it is a mere conjecture, and is only mentioned by Berry and Martin; Culley says nothing of it.

2. It is not true that, about one hundred years since, the breeders of short-horns, in the pretended improvement, "proceeded on a judicious system of crossing with other breeds; and one to which they referred was, in all probability, the white wild breed."

From the earliest period *white* cattle were known in Jutland, Holstein, (Denmark,) Hanover, Oldenburgh, and Holland. From the earliest accounts we have of the short-horn in England, the *white* is known to have existed very anciently. The source then of the

white color is very evident; it came from the continent to England with the short-horns themselves. Bailey, in his Survey of Durham, (1810,) says that "about seventy years since, the colors of the cattle of Mr. Milbank and Mr. Croft, were red and white, and white with a little red about the neck, or roan. This information was communicated by Mr. Thomas Corner, now near ninety years of age; and Mr. George Culley says that he has repeatedly heard his father state the same particulars." This refers to the period prior to 1740. Now, at this period, 1740, there were no wild cattle except in Chillingham Park, Northumberland, Craven Park, Yorkshire, and Chatelheraut Park, Lanarkshire, Scotland. Mr. Berry fixes the period of 1740 as the time at about which the improvements by supposed crossing were made in the short-horns. Then the persons making the cross must have gone to one of these parks for the means. What is the character of these cattle? Culley in 1785 described them thus:—"Their color is invariably a creamy white, *muzzle black*, the whole of the inside of the ear, and about *one-third* of the *outside*, from the tips downward, red, horns *white with black tips*, very fine and bent upward; some of the bulls have a thin upright mane about an inch and a half or two inches long." Such they are now, and a *personal inspection* of them authorizes the statement. Mr. Culley omitted to say that they have a *dull ferocious eye*, encircled by a *black* ring. If *this was* the cross which gave the *white* color to short-horns, it *would as certainly* have given the *black nose*, the *black tipped horn*, and the *dull ferocious eye* with *its black rim*. Was a short-horn of *known* purity, of *white color*, with these *characters, ever seen?* The internal evidence is then against this cross having been made. But the thought of this cross is of *recent* origin, not dating back farther than thirty years; and is *only* a *supposition* at best. The white color then is original with the short-horns, and came not from the white wild breed.

3. It is not true that C. Colling exclusively improved the short-horns, or bred better ones than he originally obtained to breed from.

Mr. Berry in both his histories gives no one credit for improvement in the short-horns but to Charles Colling. Except with Mr. Berry, it has always been conceded that his brother Robert Colling was quite as good a breeder as Charles. They commenced their breeding together, got cows from the same sources in several instances, and interchanged bulls throughout their joint career. If a preference was given to either, it would seem to have been rather to Robert than Charles. Three of their contemporaries, who were familiar with their cattle, and two of them their intimate personal friends, and, from capacity and circumstances, the best of judges, are quoted.

Mr. Bailey, in his Survey of Durham, says, "Messrs. Collings' have frequently sold cows and heifers for £100; and bull calves at £100.

These gentlemen let bulls out by the year; the prices from 50 to 100 guineas; and the public are so fully convinced of their merits, that these celebrated breeders cannot supply the demand from the pure blood." There seems no distinction here between the two brothers, and in Bailey's *whole* account there is no indication that either he or the public thought Charles superior to Robert.

The celebrated Thomas Bates, of Kirkleavington, was the intimate friend of both the Collings; and bought cattle of Charles, deriving from him his famous Duchess tribe. No man ever had a fuller knowledge of the cattle of the two brothers than he; and he was, as a judge, unsurpassed. His merits as a breeder are such that in modern days no man in public estimation has excelled him. The sale, in 1850, of his cattle realized higher prices than any other since the days of the Collings. Mr. Bates, in a letter in the New Farmer's Journal, says: "The superiority of the stock of Mr. R. Colling's White Bull (151) over Favorite's stock (252) was evident to me in 1804—and was admitted by Mr. C. Colling—and I would gladly have then given 100 guineas to have had my first Duchess bulled by him, but I could not obtain it on any terms, and it was twenty-seven years afterwards before I obtained the same blood in Belvedere, (1706)." No one ever doubted Mr. Bates' judgment; and he never had any of Robert Colling's blood, until he got it in Belvedere, Marske, and Red Rose, years after this.

Mr. John Hutchinson, the banker and breeder, in the history of his own short-horns, comparing the cattle of the two Collings, and particularly in quality, "and their length of mossy hair, their neatness of shape, quick prominent eyes, and short legs," says: "Wellington and Barmpton were surely the neatest, the softest, and the shortest legged of his bulls, as was Moss Rose, of his cows, and had more highland-like hair—like all their descendants—than any I have seen of the Kettons (Charles Colling's)." And speaking of Robert Colling's cow Nonpareil, he says, "which I have heard called the finest cow (perhaps) ever seen." Mr. Hutchinson never used a bull of Mr. R. Colling's breeding, save two, but did several of Charles's, indeed as many as eight or nine, and was more interested in Charles's blood than in Robert's.

It is evident that, at least, Charles Colling was *not superior* to Robert, as a breeder.

Now let us see if Charles Colling was superior to the breeders of 1785, the period when he commenced his breeding. The character of the famous bull Hubback is so well known, as the *best* bull the Collings *ever owned*, that not a word is necessary to establish this point. By common consent, every historian of short-horns recognizes the wonderful merit of Hubback. Major Rudd, a large purchaser at C. Colling's sale, says of Hubback, that he "was the *main root* of the improved short-horns;" and Mr. Hutchinson says,

"The bull Hubback being now pronounced the *grand cause of improvement* of the Ketton and Barmptons, it behooves every breeder to prove his stock related to this *wonderful animal.*" Yet Mr. Hunter *bred* Hubback, and *not* Charles Colling.

Mr. Bates in a letter relating to his Duchess tribe of cattle, says, "I purchased my original cow of this tribe of cattle, of the late Charles Colling, Esq., of Ketton; they had been in the possession of Mr. Colling twenty years, who purchased his original cow from Stanwix, and called her Duchess, which Mr. C. Colling repeatedly assured me *was the best he ever had or ever saw*, and that he never was able to improve upon *her*, although put to his best bulls."

Mr. Charles Colling never bred out of the cow Lady Maynard, (Favorite), so good and fine a cow as she was herself. Mr. A. B. Allen, editor of the Agriculturist, in his "History and Traditions of Shorthorn Cattle," says: "It was conceded by a company of old breeders in 1812, in discussing the question of the improvement of shorthorns, that no stock of Mr. Colling's breeding ever equalled "Lady Maynard," the dam of Phœnix and grandam of Favorite." And Mr. Bates states the same as having again taken place in 1822, at another meeting of old breeders, *of whom Mr. Colling* was one; and that Mr. C. himself admitted that he had never, in the descendants of Lady Maynard, bred anything better than herself.

It is evident from these authorities, that Mr. C. Colling procured originally some animals, than which he never bred anything better; and beside those named, this was the case with Haughton, by Hubback, bought by Mr. Colling of Alexander Hall; and the original of the Daisy tribe, bought of Mr. Waistel, of Great Burdon. There is no doubt that he obtained the *very best* material, for his breeding, to be had. His brother Robert did the same.

Hutchinson says, "no breeders acted with so much foresight and sound policy—for who but themselves, would have thought of feeding any animal from calfhood until seven years of age, in so extravagant a manner as the White Heifer (and the Durham Ox) was fed and made a monster of. The scheme was a deep one, and succeeded to a miracle. She, (as well as the Durham ox,) was shown all over the kingdom, and raised the character of their breed, in the opinion of the world, to the highest pitch of eminence."

Great credit is due to the Messrs. Colling for the herds they reared and disseminated; and while it is true that in their career they had the best herds then in existence, it is equally true that they never bred better animals than they procured originally, with which to commence breeding.

The obvious and great merit of the Collings was, that they brought the short-horns into *general* notice, out of a *local reputation*, and made them as well known abroad as they were in the valley of the Tees river; not that they improved on their good originals.

4. Mr. C. Colling did not reduce the size of his short-horns, but, on the contrary, increased it.

Hubback was a small bull. Mr. Berry, supposing a reduction of size aimed at, says, (at page 97,) "the quality of his flesh, hide, and hair are supposed to have been seldom equalled; and as he was *smaller* than the Teeswater cattle, he was eminently calculated to forward Mr. Colling's views." Mr. Foss, in a letter to Mr. Hutchinson, says the dam of Hubback was a "beautiful *little* short-horned cow." Smallness of size was then a family trait with Hubback.

It is also known that Mr. Colling's cows, Haughton, by Hubback, bought of Alexander Hall; Lady Maynard, and her daughter, Young Strawberry, bought of Mr. Maynard, *were all small cows.* Haughton was the dam of the bull Foljambe, (*a large one,*) bred by Mr. Colling, got by Barker's bull, (a very large one); Young Strawberry, the dam of Bolingbroke, (a medium sized bull,) got by Foljambe; and Lady Maynard, the dam of Phœnix, (a very large cow). Favorite—*a very large bull*—was got by Bolingbroke, out of Phœnix.

Favorite was calved in 1793, eight years after C. Colling began to breed; and beginning in 1795, he scarcely used any other bull for ten years; putting him to his own daughters, even in the second generation, (as by Favorite, dam by Favorite, grandam by Favorite). In the catalogue of his sale, of the forty-seven animals named, forty-three were got by Favorite and his sons, and all save one were got by Favorite, his sons, and grandsons.

Mr. R. Waistell, son of the Mr. Waistell who jointly with R. Colling owned Hubback, says as to Foljambe:—"He was a *large strong* bull, a useful, *great, big, bony* beast, of great substance." Mr. Waistell also says, "Favorite was a *grand* beast, *very large,* and *open,* had a fine brisket, with a good coat, and was as good a handler as ever was felt." Mr. Allen, in his "History and Traditions," says, "Phœnix, the dam of Favorite, was a *large open boned* cow, with more horn, and altogether *coarser* than her dam, the beautiful Lady Maynard;" and again, "Favorite was a *large massy* animal, *partaking more* of the *character* of his dam Phœnix, than that of his sire. He possessed remarkably good loins, and long level hind quarters; his shoulder points *stood wide,* and were somewhat *coarse,* and *too forward* in the neck; his horns also, in comparison with Hubback's, were long and strong."

Col. Trotter, an old breeder, born in 1764, in a letter to Mr. Bates, says that "Barker's bull, (sire of Foljambe,) was a *large coarse* beast, with a large head."

Of the get of Favorite, Mr. Berry, in his history—pages 99–104—mentions two—the Durham Ox, and Robert Colling's White Heifer; the ox's live weight was 3780 lbs! the heifer's dead weight at four years was estimated at 1820 lbs! Her live weight could not have been less than 2300 lbs! doubtless the largest four year old short-

horn heifer ever known. The Durham Ox was the largest short-horn one ever known, except the Spottiswood Ox. Mr. Colling fed and sold, in 1799, a heifer by Favorite, which Berry states in his *first* history, "weighed, at three years old, one hundred stones, (1400 lbs!) within a few pounds." Her live weight must have been 1700 lbs.—a wonderful three year old heifer.

It will be seen that here are three animals, the only ones bred by Colling whose weights are on record, that have no superiors (indeed where are their equals?) in point of wonderful weight in all the records of short-horns.

To attain these extraordinary weights, they must not only have been very deep fleshed and very fat, but must have had large, very large, frames, to give the space to make such great weights.

Can there be a doubt that Charles Colling increased the size of his cattle? Mr. Berry in his *first* history mentions nothing of a reduction of size, and nothing of the Galloway cross; yet when he proposes in his second history to show the excellence of the *alloy*, as the Galloways are a very *small* breed, it became necessary to discover that Mr. Colling had reduced the size of his cattle. Mr. Berry states, that Mr. Colling always "declined on all occasions to throw any light on his views and proceedings." Of course Berry got no authority from Mr. Colling for this alleged reduction of size, but is himself the originator of the supposition. Facts, and the history of the Short-Horns, contradict him.

5. Hubback was a pure short-horn—had no Dutch blood; and was vigorous until thirteen years of age, when he was killed.

In his second history Berry says (page 97), "Hubback, an animal respecting which there has been much controversy, principally touching the purity of his blood, a question now of little importance, because it is admitted on all hands that Mr. Colling adopted another cross, which prevails in a majority of superior short-horns of the present day." "Without entering on an inquiry by what circumstances Hubback's title to be considered of pure blood is supported or weakened, it may suffice to observe, that it appears *probable* he possessed on one side the imported [Dutch] blood. The possessor of his dam was a person in indigent circumstances, and grazed his cow in the highways. When afterwards she was removed to good land, near Darlington, she became so fat that she did not breed again; and her son, having the same feeding propensity in a high degree, was useful as a bull during a very short period." Such is Mr. Berry's account.

All the authorities for the impurity of Hubback's blood shall be quoted.

Major Rudd in 1816 says, "The bull Hubback was descended from the stock of Sir James Pennyman, who, about the year 1770, paid much attention to the improvement of short-horned cattle, and

purchased the best bulls and cows he could procure. He purchased several cows of Sir Wm. St. Quintin, of Scampston, who was then celebrated for his breed of short-horned cattle. It is *probable* that Hubback *may have been* descended from this breed, *but the fact cannot be ascertained.*" Again, in 1821, he says, "The sire of Hubback was descended from the stock of Sir William St. Quintin. I was intimately acquainted with Sir James Pennyman's steward, who has repeatedly assured me that Sir James told him that his breed was a cross between the old short-horn and the Alderney. Such, then, being the pedigree of Hubback, it follows that all the improved short-horns are a mixed breed."

And again, in 1821, Major Rudd says, "The sire of Hubback belonged to Mr. George Snowdon, *who had been a tenant* of Sir James Pennyman, and *by that* means derived his bull. It is certain that the late Mr. Robert Colling *believed* the descent of that bull to be from the stock of Sir J. Pennyman and Sir Wm. St. Quintin; for in his catalogue of his stock in 1818, he deduces the pedigrees from their stock. Of this proof, I was not apprised when my Notes were published."

That it may be seen what Major Rudd deems proof, derived from R. Colling's catalogue, all in that catalogue that relates to Pennyman and St. Quintin is given. It is the pedigree of *one* cow *only*—thus, "No. 3, Juno, by Favorite; dam Wildair, by Favorite; grandam, by Ben; great grandam, by Hubback; great great grandam, by sire (Snowdon's bull) of Hubback; great great great grandam, by Sir James Pennyman's bull, descended from the stock of the late Sir W. St. Quintin, of Scampston." It will be observed that here is no pedigree of Hubback. Major Rudd cites this pedigree to *prove* that *Hubback* was descended from Pennyman's stock, and that R. Colling *so believed;* while it proves *only* that Hubback *was used* to bull *a cow* descended from Pennyman's stock. And *all* the proof used to show Hubback's blood impure, is about as *worthless* as this.

The proof to establish the purity of Hubback's blood is full and conclusive. In Coates' "Short-Horned Herd Book," his pedigree is thus given:

"Hubback, yellow-red, and white, calved in 1777, bred by Mr. John Hunter; got by Mr. George Snowdon's bull; dam (bred by Mr. John Hunter) by a bull of Mr. Banks's of Hurworth; grandam bought of Mr. Stephenson, of Ketton. Hubback, by Snowdon's bull (d. from the Stock of Sir James Pennyman, and these from the Stock of Sir William St. Quintin, of Scampston); Snowdon's bull, by William Robson's bull, (bred by Mr. Waistell, of Great Burdon, near Darlington, dam Mr. Waistell's roan cow Barforth); William Robson's bull, by James Masterman's bull (bred by Mr. Walker, near Leyburn); James Masterman's bull, by the Studley bull, bred by Mr. Sharter of Chilton.

"The following account of the pedigree of the dam of Hubback was given to the author (George Coates) by the undernamed person: "I remember the cow which my father bred, that was the dam of Hubback; there was no idea then that she had *any mixed* or Kyloe blood in her. Much has been lately said, that she was descended from a Kyloe; but I have no reason to believe, nor do I believe, that she had any mixture of Kyloe blood in her.

JOHN HUNTER.

Hurworth, near Darlington, July 6th, 1822."

George Baker, Esq., of Elemore, in a letter to the Farmer's Journal, 1821, says, "Attempts have been made, by hearsay evidence and otherwise, to question the blood of Hubback. I send you his pedigree. *I have the authority of Mr. Charles Colling to say, he always considered him a thorough-bred short-horned bull.* Mr. John Hunter, of Hurworth, who sold his dam, with Hubback at her foot, to Mr. Basnett, of Darlington, says, his father bought her grandam of Mr. Stephenson, of Ketton, and *that she was a pure bred short-horn.* Mr. Alexander Hall, of Sheraton Hill Top, who lived in that neighborhood, and *remembers her and the calf perfectly well*, says, she was a beautiful color and handler, and when she got on to good land near Darlington, she got so fat she would not breed again. Hubback, he says, was got by Mr. Snowdon's bull, (a son of Mr. Robson's bull, of Dinsdale, who was bred by old Mr. Waistell, of Burdon, a very noted breeder, and got by Mr. James Masterman's bull, of Coatham, near Darlington), *and was a true bred short horn.* The above gentleman will attest the same if necessary."

Mr. Christopher Foss, in a letter to John Hutchinson, Esq., dated Nov. 30th, 1821, says, "According to your request, I called, on the 22d instant, on John Hunter, bricklayer, of Hurworth, who informed me that his father was a tenant under Madam Bland. About fifty years ago [1771], as near as he could recollect, he left off farming, and came to Hurworth, having sold off all his cattle, except one beautiful little short-horned cow, which he brought along with him. She went ever after in the lanes, he having no land. On calving to a bull belonging to Mr. George Snowdon, of Hurworth, a bull calf, she and her calf were taken to Darlington, and sold to a Quaker, who, the same day, resold her and her calf to a Mr. Basnett, timber merchant."

Mr. Robert Waistell, of Darlington, son of Mr. Waistell, of Alihill, owner with R. Colling of Hubback, says that "The farms of Barmpton and Alihill join each other. Robert Colling came to reside at Barmpton in 1783, having taken Barmpton farm in the spring of that year. He had previously resided at Hurworth. At that time Mr. Wm. Fawcett owned Hubback, and lived at Haughton Hill, where Hubback was kept and let to cows at one shilling a cow. Mr. Fawcett bought Hubback when a calf of Mr. Basnett. My father pro-

posed to Robert Colling to buy the bull together, and on Good Friday, 1783, the two went to Haughton Hill, and asked a price of Fawcett for him, and ten guineas were asked. They bid him eight guineas, and Fawcett refused, and Mr. R. Colling would give no more. On the following Sunday my father went and bargained for the bull, and agreed to give ten guineas. On his way home, he met Robert Colling, and said, "I have bought Fawcett's bull at ten guineas;" and Colling said, "I will take half," and so it was agreed. My father went for the bull next day, Monday, and paid the ten guineas. The two owned him together during the summer of 1783. My father had eleven cows served by him, and Colling had seventeen, in the season. In November following, Charles Colling said to my father, that as they were done with the bull for the season, he would give them eight guineas for him; my father replied he was willing, if Robert was, and so they sold the bull. It was a condition of the sale of my father's part, that he should have all his cows served by the bull, as long as Charles Colling owned him. In February, 1784, my father wanted a cow served by the bull, and sent her to Ketton. Mr. C. Colling sent the man, who took the cow, back to my father, to say that the bull should serve the cow, but he would charge five guineas for it. My father sent the man to Ketton for the cow, and brought her away unserved; and he had no cows served by the bull afterwards. Charles Colling kept the bull two years, and then sold him to Mr. Hubback, of Northumberland. The bull was called Hubback's bull for many years after Colling sold him. I have heard these facts many times from my father and R. Colling.

Mr. Alexander Hall, in a letter to Mr. Thomas Bates, the celebrated breeder, under date of Feb. 14, 1820, says, "I was born in the year 1754, and resided the most of my life at Haughton. Mr. Thomas Hall, with whom I lived until his death, resided there, and was a breeder of short-horns for thirty years, before 1778. I knew Mr. Stephenson, of Ketton, Mr. Colling, of Skermingham, father of Robert and Charles, Mr. Waistell, of Great Burdon, Mr. Robson, of Dinsdale, Mr. Bamlet, of Norton, Mr. Fawcett, of Haughton Hill, Mr. Hunter, Mr. Snowdon, and Mr. Banks of Hurworth, and I was well acquainted with their cattle. After the death of Mr. Thomas Hall, I was a breeder of short-horns, and sold a cow to Charles Colling and two to Robert. I used Snowdon's bull and Fawcett's bull, (afterwards called Hubback.) Mr. Hunter got his cattle of Mr. Stephenson, of Ketton, and Mr. Banks got his of Mr. Waistell, of Great Burdon. Mr. Snowdon went to live at Hurworth about the year 1773. He bred his bull, the sire of Hubback, after he went to Hurworth, and he was got by Mr. Robson's bull.

"In that day I never heard that any of these gentlemen had Dutch or Kyloe blood in their cattle, and they were all noted for the goodness of their short-horns."

Again, under date of March 20th, 1820, Alexander Hall, in a certificate given to Mr. Bates, says, "John Hunter, of Hurworth, was a mason. He bred Hubback. Hubback's dam was got by a bull owned by Mr. Banks, of Hurworth. Banks's bull had a great belly, but was out of a handsome cow owned by Mr. Banks. John Hunter bought the grandam of Hubback of Mr. Stephenson, of Ketton. Mr. Snowdon's cow that produced 'Snowdon's bull,' was a very handsome one, and remarkable for her wide hips, and fine quick eyes."

Mr. Hutchinson, the banker and breeder, says of Hubback, "It behooves every breeder to prove his own stock related to this wonderful animal (if he can); which I conceive by no means difficult to do, as no bull (as I will show) has been more easy of access. He served three years at Mr. Fawcett's, near Haughton, at one shilling a cow, before the late Robert Colling and Mr. Waistell purchased him. Mr. Waistell, during the nine or ten months he remained a partnership bull, had his twelve breeding short-horned cows served by him, and he was open and free to the whole neighborhood during that period. Mr. Charles Colling became possessed of him in October, 1783; he was then rising five years old; his price not more than £8 8s.

"But I am by no means reconciled to the idea that Mr. Colling himself ever thought so highly of this bull, as it is now confidently held out, (for he kept him only two years); otherwise would he have parted with him at seven years old, a *nameless bull?* for it is well known that he was not called *Hubback* till many years after he had been sold to a gentleman of that name, (Hubback,) at North Seaton in Northumberland.

"A dissension has arisen amongst the Ketton and Barmpton breeders; and all those who have cattle descended from the Grandson of Lord Bolingbroke—or what is now called the *alloy-blood*—want to prove that there was Scotch blood in Hubback; and, *as this cannot be done on the dam's side*, they go back to Sir James Pennyman, though I do not believe *there is a tittle of evidence* to *prove* that Hubback *was* descended from his stock; the *only reason* they have for *supposing* so is, that Mr. Snowdon *was* a tenant of Sir James. I believe I had the last conversation on this subject with poor George Snowdon myself, about three months before his death, and he certainly said that was the case, that his bull was descended from Sir James's stock, but *in what degree*, or *how related*, he *knew no more* than the man-in-the-moon. Mr. George Snowdon came to Hurworth in 1774: so much for the credibility of George Snowdon having brought this bull with him out of Cleveland, and of his having descended from the stock of the late Sir James Pennyman."

Mr. Snowdon was a tenant under Sir J. Pennyman, near Ormsby in Cleveland, and gave up his farm there, and came to the parish of Hurworth in 1774, and was a tenant under Mrs. Bland, widow of James Bland, Esq., who died in 1770.

Sir James Pennyman came to the title and estate of his family in the year 1770, by succeeding *his uncle*, Sir Wartron. He found a herd of short-horns on his estate when he came to possession, and they had been there very many years, and came originally from the Aislabies. Their excellence in the lifetime of his uncle Sir William, fourth baronet, was extraordinary. A memorandum book in possession of the family in 1848, shows that, in 1767, a cow six years old, *eating nothing but grass, and giving milk*, was killed, and her dead weight was 100 stones and upwards—*more than* 1400 *lbs.;* and another of the same age, and treated in a like manner, was estimated to weigh 10 stones (140 lbs.) more, 1540 lbs. dead weight.

Sir James Pennyman commenced breeding in 1770, and in 1773 got his first cattle of Sir Wm. St. Quintin. Now George Snowdon left Cleveland in the spring of 1774, and took with him six cows. As these were *cows* in 1774, and of course calved before 1773, they could not be descended from the St. Quintin blood in possession of Sir James Pennyman. Robson lived at Dinsdale, two miles from Hurworth. The dam of Snowdon's bull (the sire of Hubback) was bred to Robson's bull the first year Snowdon came to Hurworth. Snowdon's bull was calved in 1775, and in 1776 got Hubback, who was calved in 1777.

Thus it is evident that if Snowdon's cows had the Pennyman blood, it was of a period prior to the infusion of the St. Quintin blood. But "*in what degree, or how related*" to Sir James Pennyman's blood, Snowdon "knew no more than the man-in-the-moon."

Hubback, it is well known, was sold by Mr. Colling to Mr. Hubback, of Northumberland, in 1785. Mr. Hubback used him up to 1791, when he was fourteen years old, and the bull was vigorous to the last. Mr. Bates saw him and calves got by him in 1791,—the calves got in 1790.

Hubback was therefore a pure short-horn, and did not become impotent.

6. The Galloway cross was made by chance; and the *alloy* stock had no value, except *as conferred* by the short-horn blood in them, and *in spite* of the Galloway strain.

In the first volume of Coates' Herd Book, page 102, is the following:—"O'Callaghan's Son of Bolingbroke, red and white, bred by Colonel O'Callaghan, of Heighington, got by Bolingbroke, dam a red polled Galloway Scotch cow. This cow and another of the same breed, were purchased of Mr. David Smurthwaite, near Northallerton, by Mr. George Coates, who sold them to Col. O'Callaghan. O'Callaghan's Son of Bolingbroke, when a few days old, became the property of Mr. C. Colling, and was the sire of Grandson of Bolingbroke."

Col. O'Callaghan lived near Ketton, and when he got these two Galloways in 1791, he arranged with Mr. Colling to bull them, and

by agreement, Mr. Colling was to have the bull calves, and the Colonel to retain the heifers. One dropped a heifer, and the other a bull calf, in 1792; the latter, by the bargain, was Mr. Colling's. He was kept a bull until about a year old. Johanna, (*a very moderate cow,*) got by the Lame bull, (*a very moderate one,*) not having bred for two years, was, in 1793, turned to run with this young bull; he got her in calf, and was then castrated and fed as a steer, and was never used to any other cow. In 1794 Johanna dropped a bull calf, the Grandson of Bolingbroke, one fourth Galloway. If this cross had been made to improve the short-horns, *would* Mr. Colling have used his *poorest* cow, old Johanna, to do it with? Old Phœnix produced Favorite in Oct. 1793, and had no calf in 1794, nor 1795, and, during all that time, was bulled by Bolingbroke and other bulls of the pure blood, until, as a last hope, she was turned into the straw-yard in the winter of 1795–96, to run with this Grandson of Bolingbroke, and he got her in calf; and she in the autumn of 1796 dropped the cow, Lady. Mr. Colling never used this Grandson of Bolingbroke to any other cow. Lady's first calf was Washington. Mr. Colling used him to only three or four cows one season, and these produced nothing of any particular value. He was used by Mr. Colling no more; and he never used any other bull out of her or her daughters. The *alloy* in his hands was confined to Lady, her daughters, and the produce of her daughters. He never suffered that blood to run into his Daisy tribe, his Duchess tribe, nor the *rest* of his Lady Maynard tribe.

This *alloy* family was always extraordinarily deficient in milk, and at the sale in 1810, giving little milk, were most remarkable for their high condition, and this sold them well.

The family of Lady, her daughters, and the produce of her daughters, numbered *thirteen* at the sale of Mr. Colling, in 1810, and were far more numerous than any other. No *other* family numbered over *five*. The alloy family sold for 2082 guineas, and averaged 160 guineas; the Phœnix family, including Comet, averaged 491 g's., and without Comet averaged 237 g's.; and the Daisy family averaged 175 g's. The pure blood brought higher prices than the alloy; and in the leading families of the pure blood made higher averages. No other *family* could make so great an *aggregate*.

At this day in England they have ceased to claim any merit for the Galloway cross, and freely admit that it did no good, and that where animals having it are good, they are so in *spite* of that cross, *not* in consequence of it; but *from their short-horn blood*.

The most extraordinary sales of short-horns in modern days, were those of the herds of Earl Spencer and Mr. Bates; and these breeders wholly rejected and avoided the Galloway *alloy*, as did Mr. Mason, (the contemporary and intimate friend of Mr. Colling) from whom Lord Spencer derived his cattle.

Mr. Youatt, contradicting Berry in his claim of the value of this *alloy* blood, says, (page 99,) "The dam of Lady was Phœnix, also the dam of the bull Favorite, and as the Grandson of Bolingbroke is not known to have been the sire of any other remarkably good animal, it is most probable that the unquestionable merit of Lady and her descendants is to be attributed more to her dam than to her sire."

This account of the Galloway cross was derived from Mr. Bates, of Kirkleavington, who had it from Mr. Colling, and knew it of his own knowledge.

Mr. Berry barely names Mr. Robert Colling, and gives only a summary of his sale. R. Colling was quite as distinguished as his brother Charles, and bred cattle at least as good. When C. Colling sold his cattle in 1810, all was inflation and war prices. Robert's sale was in 1818, amidst the depression of the agricultural interest, consequent on a return of peace. Compared with the other agricultural prices of the two periods, Robert's sale was higher in prices than Charles's. R. Colling's and Sir Henry Vane Tempest's sales are given. In Mr. R. Colling's, one cow brought 370; within 40 guineas of Mr. C. Colling's highest priced cow; and one bull 621 guineas, far higher than any one in C. Colling's sale except Comet. All agricultural products were in 1840 double the prices of 1818.

Catalogue of Mr. Robert Colling's Sale of Short-Horned Cattle, September, 1818, at Barmpton.

COWS.

Age.	Names.	Sire.	Dam.	Price. Gs.	Buyer.
17,	Red Rose,	Favorite,	By Ben,	—,	Sick and not offered
11,	Moss Bose,	do.,	Red Rose,	—,	Not offered.
11,	Juno,	do.,	Wildair by Favorite,	78,	Simpson & Smith.
4,	Diana,	do.,	Wildair,	73,	Lord Althorp.
5,	Sally,	do.,	By Favorite,	34,	Simpson & Smith.
9,	Charlotte,	Comet,	Cathaline,	50,	Mr. Brown.
6,	Wildair,	George,	Wildair by Favorite,	176,	C. Duncomb.
6,	Lilly,	North Star,	By Favorite,	66,	Mr. Skipworth.
6,	Golden Pippin,	North Star.	do.,	141,	Mr. Cattle.
6,	Blackwell,	Wellington,	Of Mr. Hill's Stock	31,	T. Hopper.
6,	Tulip,	George,	By Favorite,	70,	C. Tibbets.
6,	Trinket,	Barmptom,	do.,	143,	Simpson & Smith.
6,	Mary Anne,	George,	do.,	62,	do.
5,	Louisa,	Wellington,	do.,	37,	do.
5,	Empress,	Barmpton,	Lady Grace.	210,	C. Champion.
5,	Caroline,	Minor,	Wildair by Favorite,	160,	H. Witham.
4,	Clarissa,	Wellington,	By Favorite,	151,	Mr. Robson.
5,	Young Moss Rose,	do.,	Moss Rose,	190,	C. Duncomb.
5,	Venus,	do.,	By George,	195,	Simpson & Smith.
5,	Rosette,	do.,	Red Rose,	300,	Lord Althorp.
3,	Young Charlotte.	do.,	Charlotte,	72,	Mr. Thomas.
3,	Vesper,	do.,	By Favorite,	111,	Mr. White.
5,	Nonpareil,	do.,	Juno,	370,	Lord Althorp.
3,	Daisy,	do.,	By Favorite,	32,	Simpson & Smith.
3,	Kate,	do.,	By Phenomenon,	59,	H. Witham.

HEIFERS.

Age.	Names.	Sire.	Dam.	Prices. Gs.	Buyer.
2,	Amelia,	Lancaster,	By North Star,	76,	Mr. Maynard.
2,	Aurora,	do.,	do.,	78,	Mr. Smith.
2,	Princess,	do.,	Golden Pippin,	156,	Mr. Skipworth.
2,	Clara,	do ,	Venus,	190,	Mr. Thomas.
2,	Fanny,	Wellington,	Sally,	160,	C. Tibbets.
2,	White Rose.	do.,	By Wellington,	51,	Mr. Smith.
2,	Ruby,	do ,	Red Rose,	331,	Mr. Robson.
2,	Lavina,	Lancaster,	Young Moss Rose,	105,	do.
2,	Hebe,	Jupiter;	Lily,	90,	Mr. Thompson.
2,	Jesse,	Wellington,	Of Mr. Hill's Stock.	43,	Mr. Hutchinson.
2,	Jewell,	do.,	do.,	50,	Mr. Brown.

HEIFER CALVES.

Names.	Sire.	Dam.	Price. Gs	Buyer.
Violet,	North-Star,	By Midas,	48,	Mr. Skipworth
Sweet-brier,	do ,	Nonpareil,	145,	Mr. Maynard.
Snowdrop,	Wellington,	Tulip,	71,	Mr. Thompson.
Cowslip,	do.,	By Favorite,	54,	Mr. Layton.
Lady Anne,	do.,	By George,	100,	Mr. Barnes.
Flora,	Lancaster,	Sally,	47,	Mr. Thompson.
Cleopatra,	do.,	By George,	133,	Mr. Barnes.
———	do.,	Clarissa,	52,	Mr. Robson.
———	do.,	Trinket.	56,	Mr. Wiley.
———	Wellington,	By Wellington,	28,	Simpson & Smith.
———	Lancaster,	Mary Anne,	42,	Mr. Cattle.
———	do.,	Louisa,	38,	Mr. Smith.
———	Barmpton,	Empress,	100,	C. Champion.
———	do.,	Rosette,	123,	Mr. Robson.
———	do.,	Charlotte,	55,	Maj. Rudd.
———	do.,	Trinket,	110,	Simpson & Smith.
———	do.,	By Cleveland,	80,	Mr. White.

BULLS.

Age.	Names.	Sire.	Dam.	Price. Gs.	Buyer.
12,	Marske,	Favorite,	Brighteyes,	50,	Mr. Maynard.
11,	North Star,	do ,	By Punch,	72,	T. Lax.
10,	Midas,	Phenomenon,	Red Rose,	270,	Mr. Wiley.
8,	Barmpton,	George,	Moss Rose,	—	Not offered.
5,	Major,	Wellington,	By Phenomenon	185,	Mr. Brooks.
4,	Lancaster,	do.,	Moss Rose,	621,	Simpson & Smith.
3,	Baronet,	do.,	Red Rose,	—	Not offered.
3,	Regent,	do.,	By Windsor,	145,	Lord Althorp.

BULL CALVES.

Names.	Sire.	Dam.	Price. Gs.	Buyer.
Diamond,	Lancaster,	Venus,	102,	Mr. Donaldson.
Albion,	do.,	By Wellington,	140,	Mr. Russel.
Harold,	Wellington,	Wildair,	201,	Mr. Whitaker.
Pilot,	Major or Wellington,	Red Rose,	270,	Mr. Booth.

Total, £7853 for 61 animals.

Catalogue of Sir Henry Vane Tempest's Short-Horned Cattle, sold by his Executors after his death, October, 1813, at Wynyard.

COWS.

Age.	Names.	Sire.	Dam.	Price. Gs.	Buyer.
13,	Princess,	Favorite,	Brighteyes by Favorite,	36,	Countess of Antrim. Sir Henry's widow.
10,	Anna Boleyn,	do.,	Princess,	76,	Mr. Mills.
9,	Elvira,	Phenomenon,	do.,	96,	Mr. Binns.
6,	Trinket,	do.,	Tragedy,	45,	Mr. Parrington.
4,	Paroquet,	Wynyard,	———	52,	R. Wilkinson.
4,	Nell Gwynn,	Phenomenon,	Princess,	68,	John Wood.
4,	Alexina,	do.,	Anna Boleyn,	41,	Mr. Vansittart.
4,	Tulip,	do.,	Tragedy,	87,	Mr. Mills.
3,	Calista,	Comet,	Cora,	112,	do.
3,	Trifle,	Phenomenon,	Tragedy,	58,	Mr. Vansittart.
3,	Peg Woffington,	Wynyard,	Princess,	27,	do.
3,	Angelina,	Phenomenon,	Anna Boleyn,	63,	Countess of Antrim.
6,	Red Rose,	do.,	———	36,	Mr. Dobson.

HEIFERS.

Age.	Names.	Sire.	Dam.	Price. Gs.	Buyer.
2,	Young Tragedy,	Wynyard,	Tragedy,	70,	Mr. Bower.
2,	Matchless,	Phenomenon,	Matron,	40,	Mr. Hutchinson.
1,	Artless,	Wynyard,	Anna Boleyne,	56,	Sir B. Graham.
1,	Helen,	do.,	Elvira,	71,	Mr. Cook.

HEIFER CALVES.

Names.	Sire	Dam.	Price. Gs.	Buyer.
Patch,*	Wynyard,	———	11,	R. Wilkinson.
Careless,	do.,	Calista,	54,	Mr. Bower.
Peeress,*	do.,	———	16,	Mr. Smith.

* Grades, half blood.

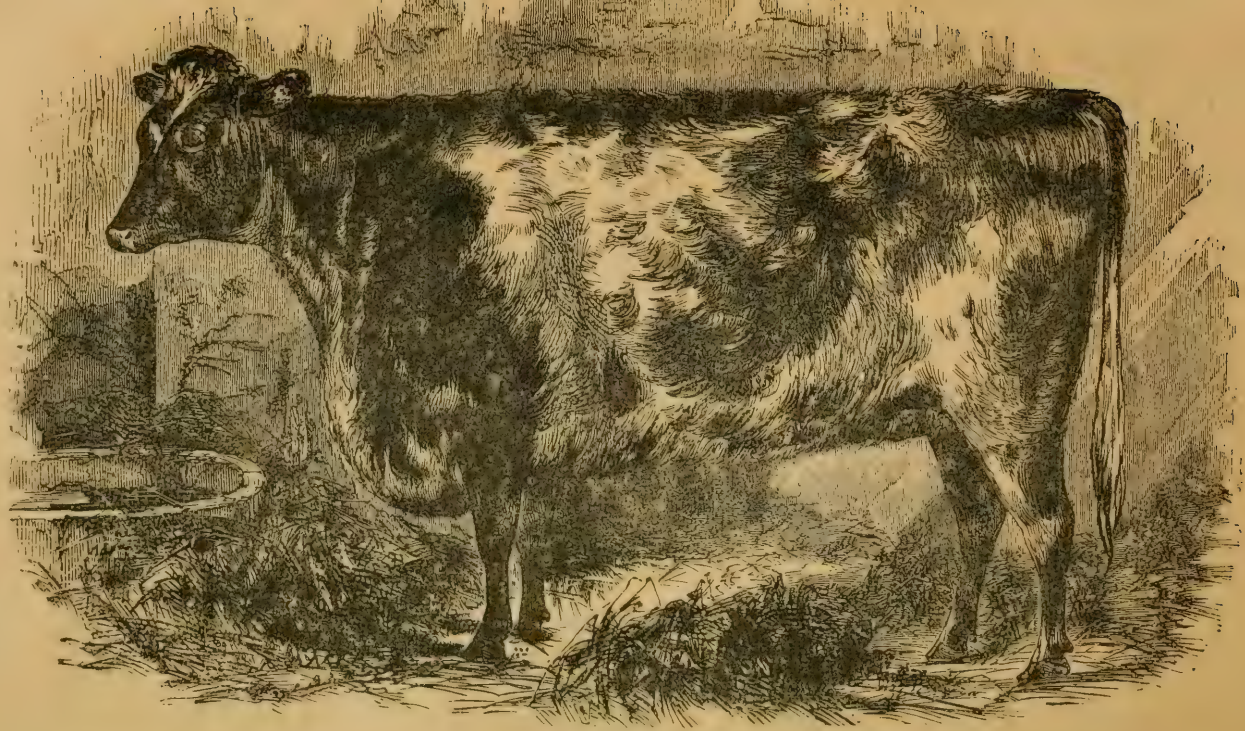
BULL CALVES.

Names.	Sire.	Dam.	Price. Gs.	Buyer.
Noble,	Wynyard,	Nell Gwynn,	51,	Mr. Jackson.
Albion,	do.,	Anna Boleyn,	52,	Rev. G. Barrington.
Pilot,	do.,	Princess,	42,	Countess of Antrim.

BULLS.

Age.	Name.	Sire	Dam.	Price. Gs.	Buyer.
7,	Wynyard,	Phenomenon,	Princess,	210,	Mr. Mills.
1,	Wellington,	Wynyard,	Alexina,	71,	Countess of Antrim.

Total, £1618 for 25 animals.



Princess II.

Winner of the first prize for yearling Short-Horn Heifers, at Syracuse, in 1849; and of the first prize for two year old Short-Horn Heifers, at Albany, in 1850, at the New York State Agricultural Society's Shows in those years. She was bred by Mr. Stephenson, of the County of Durham, England, and was imported by, and is the property of Ambrose Stevens, of New York.

Of the breeders contemporaneous with the Collings, the most prominent were Sir Henry Vane Tempest, Col. John Trotter, and Mr. Mason. These gentlemen all derived their animals to commence with from the Ketton and Barmpton herds; Sir Henry's and Col. Trotter's being entirely from Robert Colling. It was the singular fortune of the Colonel, to sell three cows to Col. Melish for 2100 guineas, (£2210,) a high evidence of the superiority of his breeding, and the excellence of his cattle. Col. Melish resold one of the three to Major Bower for 800 guineas. This was just twice the price of the highest of the cows in Charles Colling's sale. Col. Trotter bred that very superior bull Baron, (58,) sold to Mr. Duncomb at a very high price. He was used with great success by Mr. Duncomb.

Mr. Mason was coeval nearly with the Collings, and continued breeding until 1829, when he sold, and his herd realized great prices. The leading purchaser was Lord Althorp, (afterwards Earl Spencer,) who reared a large and valuable stock from this source, which numbered about 150 when he died; they were by his legatee, Mr. Hall, sold for very great prices, one bull reaching 400 and another 370 guineas, and some cows going to 200 guineas.

Sir Henry Vane Tempest of Wynyard, was clearly the leading breeder other than the Collings, during the period of the existence of the Ketton and Barmpton herds; and so far as permanent influence on the present short-horns is concerned, the best breeder. He commenced by the purchase from Robert Colling of a cow of his very extraordinary Princess tribe. From her are descended the famous and unsurpassed tribe of the Princess family, so distinguished in this day; and which is now, in its pure state, in England, *solely* in the possession of Mr. John Stephenson, of Wolviston, county of Durham.* Sir Henry died in 1813, and his widow, the Countess of Antrim, continued the Wynyard herd till 1818, when she sold off her cattle. At her sale Mr. Stephenson purchased the cow Angelina, of the Princess family, and from her he has reared his present herd of that tribe, of which his cattle wholly consists.

Of the breeders of *the present day*, Mr. Stephenson and Mr. Bates of Kirkleavington, are more distinguished for the high style and quality of their cattle than any others in England. As a bull breeder, Mr. Stephenson has no equal. Mr. Bates commenced his breeding with the Duchess tribe, the last of which, owned by C. Colling, he bought, and until his death in 1849, it remained wholly in his possession. It has now been distributed at very large prices. Mr. Bates resorted to Mr. Stephenson's blood, and through Mr. Stephenson's bull Belvedere, [1706,] greatly improved his short-horns. His prominent prize animals were got by Belvedere.

* The only other persons possessing females of this blood in its pure state, are Col. Sherwood, and Ambrose Stevens, of New York. They derived theirs from Mr. Stephenson, and in 1849 and '50 imported eight heifers and cows from him.

HEAD OF MR. STEPHENSON'S CELEBRATED BULL WATERLOO.

The above cut of the head of Mr. Stephenson's celebrated bull Waterloo presents to the reader the very perfection of a fine short-horn head. The horn is small, well placed and regular; the forehead is broad and indented; the eye large, prominent, and bright, yet placid; the nose small and tapering; the muzzle fine and clean; the nostril wide and large; the lips thin and delicate; the cheek thin, clear, and fine; the neck small at the union with the head; the throat clean and well cut up; the whole head small and beautiful, yet grand, and showing great constitution and stamina. Such a head will always have connected with it quality of the very highest kind—good hair—good handling—good flesh—feeding capacity.

So far, the American Editor; and Mr. Youatt now resumes.

The Yorkshire cow, which now almost exclusively occupies the London dairies, is an unanswerable proof of the possibility of uniting the two qualities to a great degree of perfection, *but not at the same time*:—they succeed to each other, and at the periods when it suits the convenience of the dairyman that they should. Years ago the Yorkshire cow was, compared with other breeds, as great a favorite in the London market as at present. She yielded more milk, in proportion to the quantity of food consumed, than could be obtained from any other breed; but when the dairyman had had her four or five years, she began to fall off, and he dried her and sold her. It took a long time to get much flesh upon her; and when he calculated the expense of bringing her into condition, he found that his cheapest way was to sell her for what she would fetch, and that seldom exceeded *5l.*

By degrees, however, the more intelligent of the breeders began to find that, by cautiously adopting the principle of selection—by finding out a short horn bull whose progeny were generally milkers, and crossing some of the old Yorkshires with him,—but still regarding the milking properties of the dam, and the usual tendency to possess these qualities in the offspring of the sire, they could at length obtain a breed that had much of the grazing properties of the short-horn in the new breed, and retained, almost undiminished the excellences of the old breed for the pail. Thence it has happened that many of the cows in the London dairies are as fine specimens of the improved short horns as can possibly be produced. They do not, perhaps, yield *quite* so much milk as the old ones, but what they do yield is of better quality; and whether the dairyman keeps them a twelvemonth or longer—and this is getting more and more the habit of these people—or whether he milks them for three or four years—as soon as he dries them, they fatten as rapidly as the most celebrated of the high bred short-horns.

We give a fair specimen of one of these cows: the character of the Holderness and the short horn beautifully mingling. A milch cow good for the pail as long as wanted, and then quickly got into marketable condition, should have a long and rather small head; a large-headed cow will seldom fatten or yield much milk. The eye should be bright, yet peculiarly placid and quiet in expression; the chaps thin, and the horns small. The neck should not be so thin as common opinion has given to the milch cow. It may be thin towards the head; but it must soon begin to thicken, and especially when it approaches the shoulder. The dewlap should be small; the breast, if not so wide as in some that have an unusual disposition to fatten, yet very far from being narrow, and it should project before the legs; the chine, to a certain degree fleshy, and even inclining to fullness; the girth behind the shoulder should be deeper than it is usually found in the short horn; the ribs should spread out wide, so as to

give as round a form as possible to the carcass, and each should project farther than the preceding one to the very loins, giving, if after all the milch cow must be a little wider below than above, yet as much breadth as can possibly be afforded to the more valuable parts. She should be well formed across the hips and on the rump, and with greater length there than the milker generally possesses, or if a little too short, not heavy. If she stands a little long on the legs, it must not be too long. The thighs somewhat thin, with a slight tendency to crookedness in the hock, or being sickle hammed behind: the tail thick at the upper part, but tapering below; and she should have a mellow hide, and little coarse hair. Common opinion has given to her large milk veins; and although the milk vein has nothing to do with the udder, but conveys the blood from the fore part of the chest and sides to the inguinal vein, yet a large milk-vein certainly indicates a strongly developed vascular system—one favorable to secretion generally, and to that of the milk among the rest.

THE YORKSHIRE COW.

The last essential in a milch cow is the udder, rather large in proportion to the size of the animal, but not too large. It must be sufficiently capacious to contain the proper quantity of milk, but not

too bulky, lest it should thicken and become loaded with fat. The skin of the udder should be thin, and free from lumps in every part of it. The teats should be of moderate size; at equal distances from each other every way; and of equal size from the udder to nearly the end, where they should run to a kind of point. When they are too large near the udder, they permit the milk to flow down too freely from the bag, and lodge in them; and when they are too broad at the extremity, the orifice is often so large that the cow cannot retain her milk after the bag begins to be full and heavy. The udder should be of nearly equal size before and behind, or, if there be any difference, it should be broader and fuller before than behind.

The quantity of milk given by some of these cows is very great. It is by no means uncommon for them, in the beginning of the summer, to yield 30 quarts a day; there are rare instances of their having given 36 quarts; but the average may be estimated at 22 or 24 quarts. It is said that this milk does not yield a proportionate quantity of butter. That their milk does not contain the same proportionate quantity of butter as that from the long-horns, the Scotch cattle, or the Devons, is probably true; but we have reason to believe that the difference has been much exaggerated, and is more than compensated by the additional quantity of milk. The prejudice against them on this account was very great, and certain experiments were made, by the result of which it was made to appear that the milk of the Kyloe cow yielded double the quantity of butter that could be produced from that of the short horn. Two ounces were obtained from the milk of the Kyloe, and one from that of the short-horn.

This aroused the advocates of the short-horns, and they instituted their experiments, the result of which was much less to the disadvantage of the breed. Mr. Bailey, in his survey of Durham, gives an account of an experiment made by Mr. Walton of Middleton.

He took from his dairy six cows promiscuously, and obtained the following quantity of butter from a quart of the milk of each of them:—

No. 1, 3 oz. 6 dwts.; No. 2, 1 oz. 6 dwts.; No. 3, 1 oz. 12 dwts.; No. 4, 1 oz. 10 dwts.; No. 5, 1 oz. 14 dwts.; No. 6, 1 oz. 6 dwts.; total, 10 oz. 8 dwts.; which, divided by 6, leaves nearly 1 oz. $14\frac{3}{4}$ dwts., or about $\frac{7}{8}$ of the weight of butter from the milk of a short-horn that the same quantity of milk from a Kyloe yielded. Then, the increased quantity of milk yielded by the short-horn gave her decidedly the preference, so far as the simple produce was concerned.

This experiment brought to light another good quality in the short-horn, which, if not altogether unsuspected, was not sufficiently acted upon—that she improved as a dairy-cow as she got older. The cow, a quart of whose milk produced more than 3 oz. of butter, was

six years old, the other five were only two years old; the experiments proved that her milk was richer at six years old, than it had been at two. This deserves investigation.

Another circumstance is somewhat connected with such an inquiry. The Kyloe and the long-horn cattle seem to care little about change of situation and pasture; but the short-horn is not so easily reconciled to a change; and her milk is not at first either so abundant or so good as it afterwards becomes.

There is a great difference in the quantity of food consumed by different breeds of cattle, and that the short-horns occupy the highest rank among the consumers of food is evident enough; but we never could be persuaded that the difference of size in the same breed made any material difference in the appetite, or the food consumed. When they stand side by side in the stall or the cow-house, and experience has taught us the proper average quantity of food, the little one eats her share, and the larger one seldom eats more, even when it is put before her. There are occasional differences in the consumption of food by different animals, but these arise far oftener from constitution, or from some unknown cause, than from difference in size. Experience does, however, prove, beyond the possibility of doubt, that the larger cattle, the breed and other circumstances being the same, yield the greatest quantity of milk.

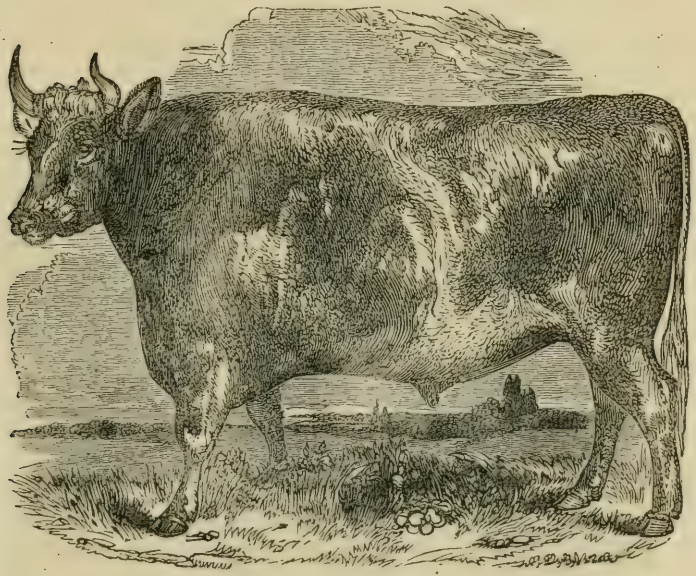
Experience has also proved another thing—that the good grazing points of a cow, and even her being in fair store condition, do not necessarily interfere with her milking qualities. They prove that she has the disposition to fatten about her, but which will not be called into injurious exercise until, in the natural process of time, or designedly, she is dried. She will yield nearly as much milk as her unthrifty neighbor, and milk of a superior quality, and at four, five, or six years old, might be pitted against any Kyloe, in the quality of her milk, while we have the pledge that it will cost little to prepare her for the butcher, when done as a milker. On this principle many of the London dairymen now act, when they change their cows so frequently.

The following observations were made by Mr. Calvert, of Brampton, on the quantity of butter yielded by one of his short-horns. The milk was kept and churned separately from that of the other stock, and the following is the number of pounds of butter obtained in each week,—7, 10, 10, 12, 17, 13, 13, 13, 15, 16, 15, 12, 13, 13, 13, 14, 14, 13, 12, 12, 13, 11, 12, 10, 10, 8, 10, 9, 10, 7, 7, 7.

There were churned 373 pounds of butter in the space of 32 weeks. The cow gave 28 quarts of milk per day, about Midsummer, and would average nearly 20 quarts per day for 20 weeks. She gave more milk when pastured in the summer than when soiled in the house, in consequence of the very hot weather. She was lame six weeks from foul in the feet, which lessened the quantity of milk.

LINCOLNSHIRE.

There is a large, coarse short-horn prevailing, particularly in Lincolnshire, denominated in the quotations of the Smithfield markets "Lincolns," but they have no further affinity with the improved short-horns than as the latter have been referred to for their improvement, which has been accomplished to a considerable degree.



LINCOLNSHIRE OX.

Breeders, with judgment, called in the aid of the short-horn, and speedily and effectually completed their object. They took away the disposition to make lean beef only, although in very great quantities; and if they could not perfectly give to the Lincolns their own early maturity, they materially quickened the process of fattening.

This cut is a fair specimen of the modern Lincoln, with a cross of the Durham, and ready for the market. It was sketched by Mr. Harvey, as it stood in Smithfield.

An improved Lincolnshire beast is therefore now a very valuable animal; and if a finer grain could be given to the meat, his great quantity of muscle, compared with that of fat, would be no disadvantage.

CHAPTER VIII.

THE ALDERNEYS.

THE ALDERNEY BULL.

The Normandy cattle are from the French continent, and are larger and have a superior tendency to fatten; others are from the islands of the French coast; but all of them, whether from the continent or the islands, pass under the common name of Alderneys.

They are found mainly in gentlemen's parks and pleasure-grounds, and they maintain their occupancy there partly on account of the richness of their milk, and the great quantity of butter which it yields, but more from the diminutive size of the animals. Their real

ugliness is passed over on these accounts; and it is thought fashionable that the view from the breakfast or drawing-room of the house should present an Alderney cow or two grazing at a little distance.

THE ALDERNEY COW.

They are light red, yellow, dun or fawn-colored; short, wild-horned, deer-necked, thin, and small boned; irregularly, but often very awkwardly shaped.

Mr. Parkinson, who seems to have a determined prejudice against them, says that "their size is small, and they are of as bad a form as can possibly be described; the bellies of many of them are four-fifths of their weight; the neck is very thin and hollow; the shoulder stands up, and is the highest part; they are hollow and narrow behind the shoulders; the chine is nearly without flesh; the hucks are narrow and sharp at the ends; the rump is short, and they are narrow and light in the brisket." This is about as bad a form as can possibly be described, and the picture is very little exaggerated, when the animal is analyzed point by point; yet all these defects are so put together, as to make a not unpleasing whole.

The Alderney, considering its voracious appetite—for it devours almost as much as a short-horn—yields very little milk. That milk,

however, is of an extraordinarily excellent quality, and gives more butter per quart than can be obtained from the milk of any other cow. Some writers on agricultural subjects have, however, denied this. The milk of the Alderney cow fits her for the situation in which she is usually placed, and where the excellence of the article is regarded, and not the expense: but it is not rich enough, yielding the small quantity that she does, to pay for what she costs. On the South coast of England, there is great facility in obtaining the Alderney cattle, and they are great favorites there.

ALDERNEY COW.

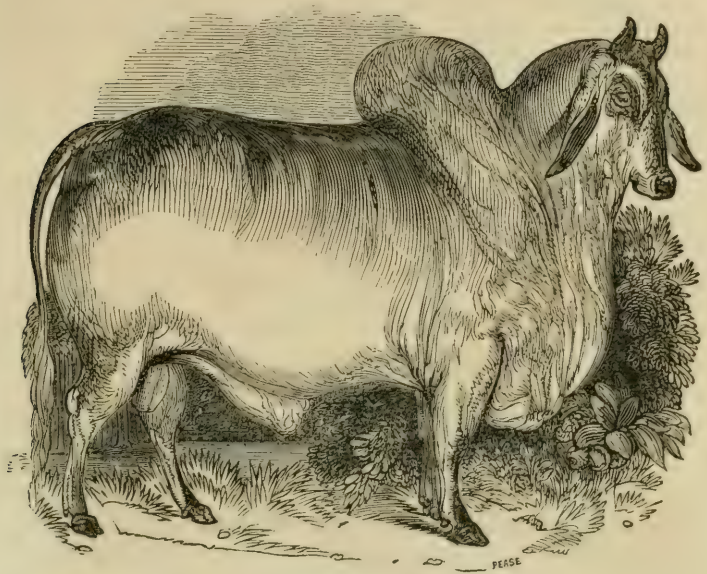
One excellence it must be acknowledged that the Alderneys possess; when they are dried, they fatten with a rapidity that would be scarcely thought possible from their gaunt appearance, and their want of almost every grazing point, while living.

Some have assigned to the Norman or Alderney cattle a share in the improvement of the old short-horns; but the fact does not rest on any good authority.

EAST INDIAN CATTLE.

Several varieties of these have been imported, and attempts made to naturalize them, but with varied success, and among them the Nagore cattle.

They are used in India by the higher orders, to draw their state carriages, and are much valued for their size, speed, and endurance, and sell at very high prices.



THE NAGORE BULL.

They will travel, with a rider on their back, fifteen or sixteen hours in the day, at the rate of six miles an hour. Their action is particularly fine—nothing like the English cattle, with the side-way, circular action of their hind legs.—The Nagore cattle bring their hind legs under them in as straight a line as the horse. They are very active, and can clear a five-barred gate with the greatest ease.

THE

ANATOMICAL STRUCTURE

AND

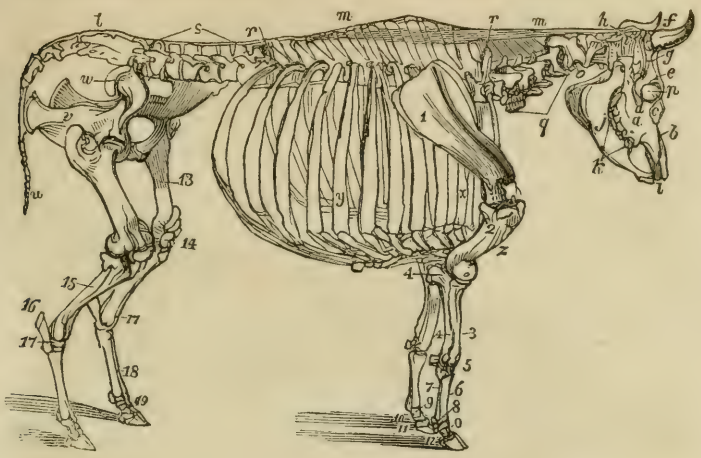
DISEASES OF CATTLE.

CHAPTER IX.

THE STRUCTURE AND DISEASES OF THE HEAD OF THE OX.

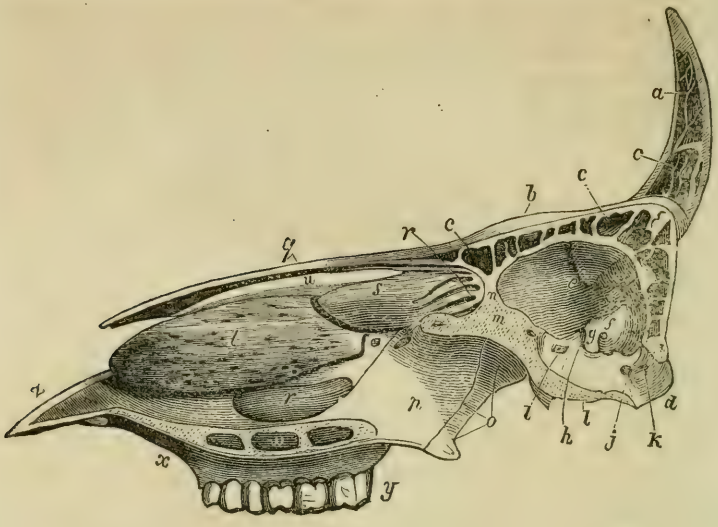
Having described the various breeds of cattle, and touched incidentally on some of the principles of breeding, we are now prepared to enter into the consideration of the structure of the ox. This will afford us opportunity of more satisfactorily elucidating the peculiarities, or *points*, on the development of which the excellence of the beast, for certain purposes, is supposed to depend; and will also enable us to understand the nature and proper treatment of the diseases to which neat cattle are subject. The first is an important but disputed topic: it has been founded too much on mere assertion; it has varied with the caprice of individuals, or the fashion of the day; and it has rarely been referred to principle, and to the necessary effect of certain conformations on the capacity of the animal for certain purposes: the latter, more important still, has been altogether neglected, for until lately there did not exist, in the English language, and scarcely in any other, a scientific and satisfactory account of the nature and causes and cure of the maladies of neat cattle; but these animals were, with few exceptions, abandoned to the tender mercies of those whose practice may be characterized as a compound of ignorance and brutality.

For the purpose of future reference, we first introduce the skeleton of the ox.



SKELETON OF THE OX.

a, The upper jaw-bone.
b, The nasal bone, or bone of the nose.
c, The lachrymal bone.
d, The malar, or cheek bone.
e, The frontal bone, or bone of the forehead.
f, The horns, being processes or continuations of the frontal.
g, The temporal bone.
h, The parietal bone low in the temporal fossa.
i, The occipital bone, deeply depressed below the crest or ridge of the head.
j, The lower jaw.
k, The grinders.
l, The nippers, found on the lower jaw alone.
m, The ligament of the neck, and its attachments.
n, The atlas.
o, The dentata.
p, The orbit of the eye.
q, The vertebræ, or bones of the neck.
r, The bones of the back.
s, The bones of the loins.
t, The sacrum.
u, The bones of the tail.
v, *w*, The haunch and pelvis.
x, The eight true ribs.
y, The false ribs, with their cartilages.
z, The sternum.
1, The scapula, or shoulder-blade.
2, The humerus, or lower bone of the shoulder.
3, The radius, or principal bone of the arm.
4, The ulna, its upper part forming the elbow.
5, The small bones of the knee.
6, The large metacarpal or shank-bone
7, The smaller or splint bone.
8, The sesamoid bones.
9, The bifurcation at the pasterns, and the two larger pasterns to each foot.
10, The two smaller pasterns to each foot.
11, The two coffin-bones to each foot.
12, The navicular-bones.
13, The thigh-bone.
14, The patella, or bone of the knee.
15, The tibia, or proper leg-bone.
16, The point of the hock.
17, 17, The small bones of the hock.
18, 18, The metatarsals, or larger bones of the hind leg.
19, 19, The pasterns and feet.



SECTION OF THE HEAD OF THE OX.

a, The horn, showing it to be a process of the frontal bone, and the manner in which it is hollowed.
b, The frontal bone.
c, The frontal sinus, extending from the nasal bone almost to the tip of the horn and the great foramen.
d, The condyloid process of the occipital bone, and the foramen through which the spinal chord passes from the skull.
e, The cavity of the skull.
f, The petrous portion of the temporal bone appearing in the cavity of the skull.
g, The passage to the internal part of the ear.
h, The foramen, lacerum or irregular foramen, through which several of the nerves escape from the space, and some of the blood-vessels enter.
i, The foramen ovale—ovale foramen.
j, The anterior condyloid foramen.
k, The posterior do.
l, The basilar process of the occipital.
m, The sphenoid bone.
n, The crista galli of the ethmoid bone.
o, The pterigoid bone.
p. The perpendicular portion of the palatine bone.
q, The nasal bone.
r, The ethmoid bone.
s, The superior turbinated bone.
t, The inferior turbinated bone.
u, The lower cell of the ethmoid, so large in the ox, as to be termed by some the middle turbinated bone.
v, The maxillary sinus.
w, The cells of the palatine bone.
x, The superior maxillary bone—its palatine process.
y, The grinders.
z, The anterior maxillary bone, destitute of incisor teeth.

The head of the ox may be divided into two parts—the skull and the face. The cut, page 144, represents a section of both.

The cranium or skull, that portion of the head which contains and protects the brain, is composed of eight bones: two frontals *e*, p. 143, and *b*, p. 144; one parietal, *h*, p. 143; two temporals, *g*, p. 143, and *f*, p. 144; one occipital, *i*, p. 143; and *d* and *l*, p. 144; one ethmoid, *n*, and *r*, p. 144; and one sphenoid, *m*, p. 144.

The frontal bones extend from the nose to the superior ridge of the skull; presenting a flattened but irregular surface, and entirely bare of muscular or fleshy covering.

HEAD OF A SHORT-HORN BULL.

THE FRONTAL BONES.

Nature has given to most cattle a formidable weapon of offence, the horn. To be effective, it must be securely based; and it could only be so, or it could best be so, by this expanse of frontal bone. From this bone the horn springs, and it is in fact a continuation of the frontal, (see *a*, p. 144.) The forehead of the bull is considerably shorter and broader than that of the cow or the ox in every breed. This shortness and breadth of forehead is not only characteristic of difference of sex, but it is regarded, and properly, as an essential

point in a bull. A deficiency here argues deficiency of constitutional power, and materially diminishes his value as a stock-getter; a cow with a large head and broad forehead, in other respects loses the most valuable points of the feminine character—she is neither a good milker, nor a good mother, nor does she often fatten kindly; there is coarseness in her whole form, and her very flesh is coarse, when slaughtered. There is no point more generally assented to by breeders that this—that a fine small head, tapering towards the muzzle, usually indicates a good milker and a good feeder, and a good temper too.

The cut of the head of the bull, page 145, except somewhat too narrow a muzzle, is a good illustration of the masculine character of a superior bull of the improved short-horn breed.

In some species of hornless cattle the expanse of this bone not being wanted as a base for the horn, is not found; but the frontal bones begin to contract a little above the eyes, and terminate in a comparatively narrow ridge at the summit of the head. This narrowness of the parietal ridge is a characteristic of the purity of the breed and its grazing qualities, particularly among the Galloway and Angus cattle, showing fineness of form, and smallness of bone everywhere.

THE FRONTAL SINUSES.

If this expanse of bone were solid, its weight would be enormous, and it would weigh the animal down. To obviate this, it is divided into two plates, separated by numerous cells; these extend through the whole of the bone, even through the parietal and occipital bones. Hence the *frontal sinuses* extend from the angle of the eye to the foramen through which the brain escapes from the skull, and to the very tip of the horn (vide *a* and *c*, p.144.)

There is a septum, or division, in the centre of the frontal sinuses. Commencing about half way up the nose, the septum is wanting at the lower part, and the two nostrils are thrown into one; and the frontal sinuses communicating with the nasal, there is one continuous cavity from the muzzle to the tip of the bone of the horn, and from one nostril to the other.

INFLAMMATION OF THE FRONTAL SINUSES.

The whole of this cavity is lined by a prolongation of the membrane of the nose, and when one part of it is inflamed, the whole is apt to be affected. This accounts for the very serious character which a discharge from the nostril sometimes assumes in cattle. The sooner a gleet from the nose of an ox is examined and properly treated the better, for the inflammation is extensive generally.

After a little cough, with slight nasal discharge, we occasionally

find the beast rapidly becoming dull and drooping, and carrying his head on one side. Either grubs or worms have crept up the nostril, and are a source of irritation there; or inflammation, at first merely of the membrane of the nose, and connected with common cold, has extended along the cavity, and is more intense in some particular spot than in others; or has gone on to suppuration, and matter is thrown out and lodged there, and generally about the root of one of the horns. The veterinary surgeon either opens the skull at the root of the horn, or, in a more summary and better way, cuts off the horn at its root. More than a pint of pus sometimes escapes; and although there may not be throwing out of pus, yet the inflammation will be materially relieved by the bleeding that follows such an operation. The opening into the sinus which is thus made should be speedily closed, or the air will render the inflammation worse than before.

On account of the vast extent of cavity from the communication between all the partitions of the sinus, the ox occasionally suffers much from the larva of a species of fly that creeps up the nose and lodges in some part; the annoyance is sometimes so great as to be scarcely distinguished from phrenitis. This does not often happen; for the sinuses are more the accidental than the natural and regular habitation of these insects.

THE USE OF THESE SINUSES.

These plates of the skull are separated from each other at least an inch at all places, and in some parts more than double that distance (see cut, p. 144). The skull is the covering of the brain. The weapons of offence spring from the skull, and are often used with terrible effect about the skull. The polled cattle use their heads as weapons of offence, and butt each other with tremendous force. If the frontal bone were so solid as almost to resist the very possibility of fracture, yet if the brain lay immediately underneath it, the concussion from the shock of their rude encounters would be dangerous, and often fatal. Therefore the bones are divided into two plates, and separated as widely as possible from each other, where, as at the parietal crest, and the root of the horn, the shock is most likely to fall. There are also inserted between the plates numerous little perpendicular walls, or rather scales of bone, (see *c*, p. 144,) of wafer-like thinness, which give sufficient support to the outer plate in all ordinary cases, and by their thinness and elasticity afford a yielding resistance capable of neutralizing almost any force. If the external plate is fractured, the inner one is seldom injured.

THE FORAMINA OF THE FOREHEAD.

There are marks of contrivance in the structure of the head of the ox, which should not be passed over. The large expanse of the

forehead ox requires much nervous influence, and a great supply of blood; and, therefore, there are two foramina, or holes one for the escape of the nerve, and the other of the artery. Each of these, however, must be of considerable bulk, and they have to run over a surface, where they are exposed to much danger. There is provision made for this—a curious groove in which they run for some distance above and below, securely defended by the ridge of bone on either side, until they give off various branches, and are so diminished in bulk, that they are comparatively out of the reach of injury. If the nerve or the artery were injured, the nervous influence and the blood would be supplied by other ramifications.

THE ARCH UNDER WHICH THE TEMPORAL MUSCLE PLAYS.

A strong process of the frontal bone goes to contribute to the formation of the *zygomatic arch*, under which the head of the lower jaw moves and is defended; and the act of mastication is thus securely performed. In the ox the teeth are never weapons of offence; he may gore and trample upon his enemy, but he does not bite him: and his food is leisurely gathered in the first imperfect mastication, and still more lazily and sleepily ground down in rumination; this arch therefore need not be, and is not, capacious and strong. It is, from situation and the general shape of the head, exempt from violence and injury; and therefore the arch not only does not project for the purpose of strength, and to give room for a mass of muscle that is not wanted, and the frontal bone does not enter into its composition at all. (See *g* and *e*, p. 143.)

THE HORNS.

The frontals in the ox in their prolongation make the horns. The fœtus of three months has no horn; during the fourth month it may be detected by a little irregularity of the frontal bone, and by the seventh month is evident to the eye elevating the skin. It now gradually forces its way through the cutis or skin, which it has accomplished at the time of birth; and, continuing to grow, detaches the cuticle or scarf skin from the cutis, and carries it with it; and this gradually hardening over it, forms the rudiment of the future covering of the bone of the horn. Beneath this cuticle the horn soon begins to form; but it continues covered until the animal is twelve or fifteen months old, giving a skinny roughness, which then peals off, showing the shining and perfect horn. The horn then is composed of an elongation of the frontal bone, covered by a hard coating, originally of a gelatinous nature. Its base is a continuation of the frontal bone, and is hollow or divided into numerous cells, (*a* and *c*, p. 144,) all communicating with each other, and lined by a continuation of the membrane of the nose.

The bone of the horn is exceedingly vascular; the most vascular in the whole frame, for it has not only vessels for its own nourishment, but for that of its covering; it is much roughened on its surface, and is perforated by innumerable vessels. It is on this account that when it is broken the bleeding is so great—it would scarcely be more profuse from the amputation of a limb.

FRACTURE OF THE HORN.

Young bullocks will often too early use their horns. In this way the horn occasionally gets fractured. If the bone of the horn is broken, but the external covering is not displaced, nothing is necessary but to fix splents to the part, and bind well up, so that the fractured edges shall be kept securely in place, and in a few weeks all will be well.

Sometimes the horny covering is torn off. If the bone is not fractured, it will be best to leave it to nature. There will be a great deal of hæmorrhage at first; but this ceasing, leaves the bone covered by coagulated blood This hardens and forms a temporary case for the bone. In the meantime another process commences at the base of the bone. A dense flexible substance is found there, and this begins rapidly to thicken and harden, and to assume the character of good horn; it then runs up the bone, displaces the crust of coagulated blood as it grows, and covers the bone completely and, much resembles and is nearly as strong as the original horn.

At other times, after the horny covering has been torn off, the bone will be found to be fractured, but the parts not perfectly separated. They must be brought in exact apposition, bound carefully up, and confined with splents, or strong bandages. Union between the edges of the bone will speedily take place, new horn grow over, and there will be scarcely a mark of the accident.

At other times, not only is the horny covering torn off, but the bone is also perfectly separated. The bone will never be reproduced; nature will often attempt it, and a rude mass will be formed, half bony and half cartilaginous. To prevent this, the horn must be sawed off level below the fracture, and the nearer the head the better, because it will be the sooner covered by a prolongation of the cuticle. The hot iron must be frequently passed over the level surface, after which this reproduction will seldom be attempted; or, if it is, may be easily destroyed by the cautery. As soon as the bone has been sawed off level, and the bleeding stopped, and the cautery applied to the exposed surface, the part must be bound up as quickly as possible with one tar-cloth above another, so as completely to exclude the air: for the air being now admitted unrestrained to the frontal sinuses, so irritable, it may produce dangerous inflammation. Cases are frequent in which inflammation of the brain or lock-jaw have followed a broken

horn, and from this cause—the exposure of the lining membrane of the cells of the head to the unaccustomed stimulus of the air.

COMPOSITION AND GROWTH OF THE HORNY COVERING.

The horn is exceedingly thin at its base, and appears as a continuation of the cuticle; dissection cannot trace any separation between them; but maceration has proved that the cuticle and the covering of the bone of the horn are two distinct substances. In the ox, from a prolongation of the cuticle proceeds the covering of the bone of the horn, or at least the basis of it. The rings at the base of the horn, and which gradually recede from the base, prove this: but the horn thickens as it grows out, and this thickening, and the greater portion of the horn, are derived from the vascular substance that surrounds the bone, and which is fed by the innumerable vessels, that are interposed between it and the horn.

RINGS OF THE HORN.

These rings have been considered as a criterion by which to determine the age of the ox. At three years old, the first distinct one is usually observed: at four years old two are seen; and so on, one being added on each succeeding year. Hence the rule, that if two be added to the number of rings, the age of the animal would be given.

These rings, however, are perfectly distinct in the cow only; in the ox they do not appear until he is five years old, and are often confused: in the bull they are either not seen until five, or cannot be traced at all. They are not always distinct in the cow; the two or three first may be, but then come mere irregularities of surface, that can scarcely be said to be rings, and which it is impossible to count. If a heifer goes to bull when she is about two years old, there is an immediate change in the horn, and the first ring appears; so that a real three-year-old would carry the mark of a four-year-old. After the beast is six or seven years old, these rings are so irregular that the age indicated by the two horns is not always the same. A difference of one year is seen, and in some instances the horns do not agree by two years at least. As a process of nature, it is far too irregular for any certain dependence.

THE DEGREE OF FEVER ESTIMATED BY THE HORN.

The farrier and the cow leech, when examining a sick beast, feel the root of the horn and the tip of the ear. There is much good sense about this. If the temperature is natural in both, there is no great degree of fever; but if the ears are deathy cold, it shows that the blood is no longer circulating through the small vessels, but congesting round some important organ, the seat of inflammation—and

nothing can be more dangerous. He also gains from the horn an indication quite as important. The horn at the base is very thin; as much so as the cuticle or scarf-skin, and covers one of the most vascular bones in the whole body. Nowhere else can the practitioner get so near to the circulating fluid, or to so great a quantity of it. He, therefore, puts his hand on the root of the horn, to see the precise temperature of the blood, and thus to judge of the degree of general fever or constitutional disturbance.

THE HORNS THE DISTINGUISHING CHARACTER OF THE DIFFERENT BREEDS.

We have classed the different breeds of cattle according to the length of horn, and we cannot have a better guide. In the crosses between them, the horns follow a determined course; as long as the breed remains pure, cattle may be increased or diminished in size, be changed in the proportions of various parts for certain purposes—be made true grazing or dairy cattle, but the horn remains the same; it is the distinguishing badge of the breed.

In the present race of short-horns there is a great variety in the form of the horn. Some think this of little or no consequence; we are not of that number. It sometimes tells tales of crosses long gone by or forgotten, and totally unsuspected; and it is possible that they indicate certain peculiarities, excellences or defects, reaching perhaps to no great extent, yet worthy of notice. A treatise on the horns of cattle might be made a very interesting work; but it would require experience that rarely falls to one man's lot, and an unusual freedom from hypothesis and prejudice.

THE INFLUENCE OF SEX ON THE HORNS.

Of the influence of sex on the horn, we have proof every day; but it is exerted in our domestic cattle in a manner different from all other ruminants. It is the head of the male, when in his wild state, that is usually horned; the castrated male loses his altogether, or wears diminutive ones; while the female is generally hornless. On the contrary, the tame bull is distinguished by a short, straight, insignificant and ugly horn; while a weaker, but longer, handsomer, and beautifully curved horn adorns the head of the ox; and a still more delicately-shaped one the cow.

OCCASIONAL HORNS ON THE GALLOWAYS.

The most singular horn is that which now and then hangs from the brow of some polled cattle. It is no prolongation of the frontal bone; is not attached to that or any bone of the head; but grows from the skin, and hangs down on the side of the face.

THE FRONTALS IN POLLED CATTLE.

The frontal bones hold the same situation in polled cattle. They reach from the nasal bones to the parietal ridge; but they materially diminish in breadth towards the poll. The breeders of polled cattle consider this a proof of pureness of blood, and of the possession of a disposition to fatten.

Large cavities between the plates of the frontal bone are found in the polled as well as in the horned breed; but they are not so deep, nor do they extend beyond the frontals, varying much in the different breeds of cattle.

COMPARISON BETWEEN THE HORNED AND HORNLESS BREEDS.

There was a time when this question was much discussed. It was taken for granted, by those who had more theory than practical experience, that the horns were not only useless but a serious evil; and a scientific surgeon has scrupled not to say, that, "on a very moderate calculation, the loss in farming stock, and also in animal food, is very considerable from the production of horns and their appendages." The fact, however, has never been thoroughly determined, whether the Galloway, or the Kyloe, is the most profitable grazing stock; each has its advocates, and each is excellent. But it has been determined, that during the reign of the Bakewellian stock, no cattle displayed such a propensity to fatten as the long-horns; and as the chest became deeper and more circular, and the aptitude to fatten developed itself, the horn lengthened. It has also been determined, that for grazing and milking properties, and particularly for early maturity, no cattle can vie with the short-horns.

The existence of horns, or the length of the horn, have in themselves no connection at all with grazing, or with milking: a beast does not fatten the quicker because there are no horns to consume a portion of the nutriment, nor is he longer in getting into condition because he has them. They are ornamental; they cost the breeder nothing; they are useful for various purposes; and they bring so much clear gain to the manufacturer. The hornless cattle may, however, be packed closer than the others, and, destitute of the natural weapon of offence, are less quarrelsome and more docile.

THE OTHER BONES OF THE SKULL.

We shall be very brief in our account of the other bones of the skull, as little of a practical nature is connected with them.

The Parietal bone.—In the ox (*h*, p. 143,) not the smallest portion of it appears on the superior part of the head; but it is found at the back of it, usurping the place of the occipital bone, giving attachment to the muscles of the neck, and particularly to its strong supporting ligament (*m*, p. 143). It, however, spreads along the side below the horn, giving it some support; and it unites there

with the temporal bone, and contributes to the strength of the part.

The Temporal bones.—These bones (*g*, p. 143 and 144,) have no stress upon them in cattle; are small, deep in the temporal fossa, and destitute of the squamous suture. The most important difference is the form of the superficial cavity which receives the head of the lower jaw, and which is peculiarly adapted to the lateral grinding motion of rumination.

The Occipital bone.—This bone is, in the ox, deprived of almost all importance. There is no crest, no tuberosity, and very small condyles, for attachment to the neck; and even its base, although a little widened, is much curtailed in length. It, however, still contains the great foramen through which the spinal marrow escapes from the skull (*i*, p. 142, and *d* and *l*, p. 144). There are two foramina the passage of nerves.

The Sphenoid and *Ethmoid bones* are of little importance here.

THE BRAIN.

All these bones unite to form the cranial cavity in which the brain is contained. It is surrounded by membranes. Comparing the bulk of the two animals, the brain of the ox is not more than one-half the size of that of the horse. The medullary substance which forms the roots of the nerves is as large, and some of the nerves, and particularly the olfactory nerve, or that of smell, are as much developed; the deficiency is in the cineritious part—that part connected with the intellectual principle. The medullary substance is that by which impressions made by surrounding objects are conveyed to the brain, and received there, and the volitions of the mind transmitted, and motion given to every part: the cineritious is that portion where the impressions are received, and registered, and pondered upon, and made the means of intellectual improvement, and from which the mandates of the will proceed. The senses of the ox are as acute as those of the horse; he sees as clearly, hears as quickly, and has the sense of smelling in greater perfection; but he has not half the sagacity. He partly has it not, because he does not receive the education of the horse; but more, because nature, by diminishing the bulk of the intellectual portion of the brain, has deprived him of the power of much improvement. Yet the difference is in degree, and not in kind. He possesses sufficient intellect to qualify him for the situation in which nature has placed him.

PECULIARITIES OF THE BRAIN OF THE OX.

Of the peculiarities of the brain of the ox we will say little, for they are unconnected with that which is the object of our treatise, the useful knowledge of the animal. The posterior part of the

brain, under the cerebellum, or little brain, and at the commencement of the spinal chord, is a condensation of medullary matter, (the *medulla oblongata,*) whence proceed the nerves that are connected with the involuntary motions of life, and by which the heart beats, and the lungs play, and the intestines propel the food. In cattle this part is, in proportion to the size of the animal, of great bulk, for they have to contribute to the food of man; and the heart must strongly beat, and the stomach and the intestines must be constantly and actively at work, to furnish the requisite quantity of milk when living, and abundance of flesh and fat when slaughtered.

The ox, however, is, in a manner, exempt from labor. Even in the districts in which he is employed on the farm or the road, his work is slow. At the termination of this *medulla oblongata* commences the spinal chord, whence proceed all the nerves connected with the voluntary motions of the body. Now, although the *medulla oblongata* is proportionally larger in the ox than in the horse, for the reason we have just stated, the spinal chord is considerably smaller, because so much muscular power is not needed.

THE EAR.

In horned cattle, the ears, often comparatively small, and, from their situation, limited in their motions, and seldom erect, are little regarded. The bull has usually the shorter horn and the larger ear; in some breeds, particularly the Kyloe, and the Kyloe bull more especially, it has much to do with the beauty of the head.

In polled cattle, the ear, of a fair size but not too large, freely movable, and well fringed, corresponds with the beautifully curled forehead, and is a point of some importance. A large ear is generally objected to, as indicating coarseness of form, and possibly of flesh. The only advantage of a large ear would be, that it might be better able to discharge one of its functions, to guard the eyes from injury. A person cannot long observe an ox, without admiring the adroit use he makes of his ears for this purpose: but even the weight of the ear would probably interfere with the requisite rapidity of motion. The ear of the ox is furnished with two additional muscles, for this purpose.

DISEASES OF THE EAR.

The ears of cattle are comparatively exempt from disease. The passage into the ear is tortuous and guarded with hair. The irregularities of the conch are large and abrupt. The inconveniences which arise from the introduction of insects into the ear seldom occur. To contusions these organs are much exposed, producing swelling abscess, and deafness. Fomentations will afford the principal means of relief or cure, with occasional washing out of the ear with

warm water, or soap and water, and the application of a weak solution of Goulard, while much inflammation remains, and of a still weaker solution of alum, when the inflammation has subsided.

Simple inflammation of the ear is a rare disease in cattle. It is recognized by the animal carrying his head a little on one side; this is plainly referable to the ear from the heat and tenderness of its base both within and without, and a kind of immobility of the ear, resulting from the pain which the animal suffers in moving it. Bleeding from the neck vein, a dose of physic, and fomentation of the part, will usually give relief; and afterwards a lotion composed of a drachm of the extract of lead and the same of laudanum added to four ounces of water: a little of this may be poured into the ear, and the ear gently squeezed so that the lotion shall find its way to every part of it.

Sometimes the beast is much annoyed by an itching of the ear. A dry scurfiness spreads over a greater or less part of the skin of the inside of the ear. A healing ointment will afford the most ready cure. A little must be gently but well rubbed into the inside of the ear, until the scurfy skin is softened, and be repeated daily. The ointment is thus composed:—melt together four pounds of lard, and one of common resin; set them by to cool, and when they begin to thicken, stir in one pound of calamine powder, rubbed down to a state of the greatest possible fineness. In a very few instances a collection of fluid will appear between the cartilage and the inner skin of the ear. The tumor must be opened from end to end. Still more rarely fungous granulations spring up from the base of the ear. They must be cut down with a knife. Nitrate of silver must then be applied over the exposed surface, and an alum wash, not too strong, afterwards used.

Homœopathic Treatment.—If there be a foreign body in the ear, it should be removed, and *arnica* water be injected with a small syringe. If insects are the cause, a little oil is to be poured into the ear. If the inflammation, from being neglected, has passed into suppuration, pus is the best topical application: elaborated by the vital force in the wound, it serves chiefly to disintegrate the particles which have been contused or otherwise injured, to effect the expulsion of foreign bodies, such as splinters, &c., and to dispose the edges of the wound to unite by means of fleshy granulations. It is a great mistake then to remove it; it diminishes of itself as the granulations acquire sufficient consistence to form the tissue of a cicatrix. To fulfill its destination, it must be of good quality. Where its quality or characters are not such as they should be, there only art should interfere, as well to facilitate the cure of the wound itself as to secure and preserve the adjoining parts. The means to which we are to have recourse are: *arnica*, internally and externally, in wounds, &c., of every kind; *mercurius vivus* and *asafœtida*, in ulcers which secrete

a liquid and fetid pus; *arsenicum*, in such as have hard and everted edges, with pain, inflammation, and pus of bad odor; *chamomilla*, *sepia*, and *arsenicum*, when granulations grow up too luxuriant; *silicea*, when the pus is thick and of bad color; *acidum phosphoricum*, when, after a wound, the skin contracts adhesion to the bone.

When a real abscess is formed, *arsenicum* is the remedy to be employed. However, *pulsatilla* is very useful in deep-seated abscesses. When the swelling has been caused by insects, the ear should be well washed, and *arnica* water injected into it. *Petroleum* is by some considered the best remedy in such cases. Some doses of *sulphur* must be taken internally.

THE EYE.

The orbit of the eye is of a quadrilateral shape in the ox, (*h*, p. 143,) and very strongly formed above, to defend it from the violence to which, from its situation, it is too much exposed, and below, in order to protect the lachrymal sac, and the commencement of the canal through which the superfluous moisture flows from the eye to the nose. The orbit, and particularly the upper part, the superciliary ridge, is very subject to fracture. The parts must be placed in their natural situation; must be confined there; and inflammation prevented by bleeding, physicking, &c.

The ox is often wounded in the eye, either by the horn of one of his fellows or the prong of the brutal attendant. Here must be no probing, but fomentations, bleeding, and physic.

It is too much owing to the thoughtless or brutal conduct of those who have the management of cattle, that the ox, oftener than any other domestic animal, is subject to bony tumors about the eyes, or on the edge of the orbit.

These tumors appear generally on the external part of the orbit; they increase with greater or less rapidity; they take a direction which may or may not interfere with vision; occasionally they bend towards the eye, and press upon it, and are sources of torture and blindness. If the tumor is on the upper part of the orbit, and is attached by a kind of pedicle, it may be sawed off, and the root touched with the cautery; in other situations we shall generally be confined to the use of external stimulants. The best is the cautery. We shall not, perhaps, dare to apply it directly to the part, but there is a method by which we may obtain the advantage of a very high degree of temperature without destroying the skin. An iron is to be prepared, somewhat hollowed, and rather larger than accurately to contain the tumor in its hollow. A piece of bacon-rind, with a little of the fat attached to it, is then to be cut to the shape of the tumor, and so as to cover it; and being placed over it, the iron, heated nearly red hot, is to be applied upon it, and firmly held there for the space of two or three minutes,

and afterwards more lightly applied until the rind is dried or burned. The object of this is to bring a degree of heat, far above that of boiling water, but not so great as of red hot iron, to bear upon the part. The fat about the rind is heated to that degree which will probably be sufficient to rouse the absorbents, and induce them to take up the bone, without destroying the life of the part; for we shall see presently that it is a tumor of a peculiar character. This may be repeated two or three times, with intervals of two days. Should the tumor not diminish, nothing more can be done; for these bony growths in cattle, arising from local injury, have very little life in them, and soon degenerate into a state of caries, or decay of the bone.

Sometimes these tumors spring from the back of the orbit, produced by the injury or perforation of the bone. No cure can be effected; if the eye should become painful, and intensely inflamed and begin to protrude, there is but one course, to destroy the animal.

External bony tumors frequently ulcerate, and the bone becomes carious or decays. No possible good can be done here, and humanity and interest require us to put a speedy termination to the animal.

The eyes are placed quite on the sides of the face, for the ox, in a state of nature, being exposed to the attacks of ferocious animals, needs an extended field of vision to perceive danger in every quarter. He is oftener the pursued than the pursuer, and requires a lateral, instead of a somewhat forward direction of the eyes. The eyes are prominent, to increase the field of vision, and are made so by the mass of fat accumulated at the back of them. A prominent eye is a good point in a beast; it shows the magnitude of this mass of fat, and therefore the probability of fat being accumulated elsewhere. This prominence, however, should not be accompanied by a ferocious or unquiet look; neither the grazing nor milking beast can have too placid a countenance, or be too quiet and docile.

THE EYELIDS AND THEIR DISEASES.

The eye is supported and covered by the lids, which were designed to close at the approach of danger, and so afford protection to the eye; to supply it with the moisture necessary to preserve its transparency; to shield it from the light when diseased; and to close over it, and permit the repose which nature requires. At the edge of the lids is a cartilage, to preserve their form, and to enable them to close accurately; and along these edges are numerous little openings, which pour out an unctuous fluid that defends them from the acrimony of the tears.

Cattle are subject to a pustular eruption on the edges of the eyelids, accompanied sometimes by great soreness, and considerable ulceration. It bids defiance to every application, except the mild nitrated ointment of mercury, and occasionally it does not yield even to that; yet on the approach of winter, it frequently disappears spontaneous-

ly. It indicates a foul habit of body, and is often connected with mange; and unless proper means are taken, it will assuredly return in the following spring. Purges of sulphur will be found useful; but a course of alterative medicine will be most serviceable, which should consist of one part of Æthiop's mineral, two of nitre, and four of sulphur; and be given half an ounce to an ounce every night, according to age and size.

Warts on the eyelids are best removed by the scissors—the root being afterwards touched with the nitrate of silver.

The ox has a contrivance for cleansing the eye from annoying substances. A haw, or flat piece of cartilage, of a semicircular form, is placed within the corner of the eye. When its use is required, the eye is drawn back by the retractor muscle, and the mass of fat at the inner side of the eye is forced forward, and drives the haw before it over the eye. When the retractor ceases to act, the fatty substance returns to its place, and draws back the haw within the corner of the eye.

This part of the eye is disposed to disease. The little portion of fleshy substance towards the inner edge of the cartilage, and the caruncle, or small fleshy body, placed at the corner of the eye to give a proper direction to the tears, take on inflammation from sympathy with the eye generally, or from injury, dust or gravel; they swell prodigiously, and the haw is protruded over the eye, and cannot return. Ulceration appears, and a fungous growth springs up. Every means should be adopted to save the haw, for the removal of it will torment the animal as long as he lives.

If the disease is connected with inflammation of the eye generally, all will subside with that inflammation, and this may be hastened by the application of a Goulard wash, or diluted tincture of opium. If it is a disease of the part itself, the zinc lotion must be used (two grains of white vitriol dissolved in an ounce of water, and the vitriol gradually increased to four grains; the application of it confined as much as possible to the part, and the liquid not being suffered to get to the sound part of the eye.) A perseverance in the use of the zinc wash will often do wonders. When it loses its power, a lotion of corrosive sublimate may be adopted, first of half a grain to an ounce of water, and gradually increased to two grains.

If it becomes necessary to extirpate the part, the beast must be cast; keep open the eye with the fingers; a crooked needle armed with strong silk, must be passed through the cartilage, by means of which the part may be drawn out as far as possible; and then, with a pair of crooked scissors, the haw may be neatly dissected out. If the ulceration extend to any of the parts behind, or to the neighboring tissues, they also must be removed. Considerable bleeding will probably follow the operation, and some inflammation of the neighboring parts; but they must be subdued by proper means.

If fungus sprout, it must be touched with caustic; there is little danger attending the operation.

The eyelids are more subject to disease in the ox than in any other domestic animal. If any foreign body gets into the eye, and remains long there, the eyelids partake of the irritation; become hot and tender, and much thickened, and will continue thickened sometimes after the inflammation of the eye has subsided. Fomentations will be proper here. Occasionally there is œdematous swelling of the eyelid, especially where the pasture is damp and marshy. These enlargements are too little thought of, and left to nature to relieve; but they indicate a degree of general debility, and a disposition in the eyes to disease. Many old cattle have eyelids either distended with fluid infiltrated into the cellular texture, or from which a portion of the fluid had been removed by absorption, but a deposit remained, indicated by the impression of the finger being left upon the lid, and are more or less out of condition, or will not fatten kindly, or have lately had inflammation of the eyes, or will be attacked by it soon afterwards.

A curious appearance—not disease—has been observed in the eyelids of fat bullocks. A certain portion of gas has been infiltrated into the cellular tissue. If this is a dissight, scarification may be made on the lid, and the gas gradually pressed out.

The eye of the ox generally is large and flattish; the transparent cornea is quite convex. The pupil is of a transverse oblong form; and the iris dark, but varying with the color of the animal.

It is on account of the cornea of the ox being so convex, and the lens also more than usually convex, that many cattle appear to be short-sighted, at least while they are young, when they will approach near to a stranger, before they appear to have made a satisfactory examination of him.

OPHTHALMIA.

Ophthalmia is frequent in the ox. It has a periodical character, and will disappear and return until it has its natural termination—blindness. The cases of simple ophthalmia, however, proceeding from the introduction of foreign bodies into the eyes, blows, or being the accompaniment of other diseases, and then yielding to medical treatment, are numerous in the ox, and, therefore, as it is not always possible in the early stage to distinguish the one from the other, the disease may be attacked with more confidence.

The means of cure are bleeding and physic, as the constitutional treatment; and fomentations, cold lotions—opium in tincture—saturnine lotions—zinc lotions, as local applications; the opium during the acute stage, the lead as soon as the inflammation begins to subside, and the zinc as a tonic, when the inflammation is nearly subdued.

The periodical nature of the disease being once apparent, send the animal to the butcher, or hasten to prepare it for sale; ophthalmia is certainly hereditary in cattle.

To combat *general* inflammation of the eye, bleeding, physicking, and fomentations are the principal weapons. The blood should be taken from the jugular, for that is supplied by veins coming from the inflamed parts. If the bleeding is ever local, the lid should be turned down, and the lining membrane lightly scarified. A few drops of blood thus obtained will often do a great deal of good. Fomentations having been continued for a day or two, one of the two following lotions should be used, a few drops of it being introduced into the eye two or three times every day:

Sedative Eye Lotion.—Take, dried leaves of foxglove, powdered, one and a half ounce: infuse them into a pint of Cape or dry raisin wine, for a fortnight, and keep the infusion for use.

There cannot be a better sedative in the early stage of inflammation of the eyes.

In many cases this alone will effect the temporary or perfect removal of the inflammation; but should the eye not improve, or become insensible to the tincture, try this:

Sedative Eye Lotion.—Take, extract of goulard, two drachms; spirituous tincture of digitalis (made in the same manner as the vinous in the last recipe), two drachms; tincture of opium, two drachms; water, a pint: this should also be introduced into the eye. Two or three drops at a time will suffice.

The inflammation being subdued by the one or the other of these applications, or even bidding defiance to them, and assuming a chronic form, a lotion of a different character must be had recourse to.

Strengthening Lotion for the Eye.—Take, white vitriol, one scruple; spirit of wine, a drachm; water, a pint: mix them together, and use the lotion in the same manner as the others.

When the inflammation runs high, the transparent part of the eye is apt to ulcerate, and a fungous substance sprouts, and sometimes protrudes through the lids. This should be very lightly touched with a solution of nitrate of silver, or, if it is very prominent, it should be cut off, and the base of it touched with the caustic.

A seton in the dewlap will always be beneficial in inflammation of the eye, and it should either be made of the black hellebore root, or a chord well soaked in turpentine.

Of one circumstance the breeder of cattle should be aware—that blindness is an hereditary disease, and that the progeny of a bull that has any defect of sight is very apt to become blind.

If the case is neglected, inflammation of the eye will sometimes run on to *cancer*, and not only the eye, but the soft parts around it, and even the bones, will be affected.

When this termination threatens, the globe of the eye will usually turn to a bottle-green color, then ulceration will appear about the centre of it, and the eye will become of three or four times its natural size, or it will gradually diminish and sink into the orbit.

The fluid discharged from it will be so acrid that it will excoriate the parts over which it runs, and the lids will become swollen and ulcerated.

The most humane method to be adopted with regard to the animal, is to remove the eye. If the owner does not think proper to adopt this, let him try to make the beast as comfortable as he can. The part should be kept clean, and when there appears to be any additional inflammation, or swelling, or pain, the eye should be well fomented with a decoction of poppy-heads.

Homœopathic treatment.—The cure is easily effected, when the case is taken in time; commence with a few doses of *aconitum*, which is to be employed at first from hour to hour; then at longer intervals. Resort afterwards to *arnica*. If it be too late, *conium* must be given, which is also indicated when *aconitum* and *arnica* have removed the inflammatory symptoms, but there is an exudation between the laminæ of the cornea. *Cannabis*, *belladonna*, or *euphrasia*, in two ounces of distilled water, form an excellent topical application; but they should also be used internally. If the ophthalmia has been occasioned by a foreign body in the eye, it calls for a different treatment. Extract the foreign body with a bit of moistened linen; *conium* then removes the symptoms, and if there have been any injury, *arnica* should be prescribed, both externally and internally. Ophthalmia caused by cold soon yields to *aconitum*, *bryonia*, *dulcamara*, and *euphrasia*.

When the disease proceeds from an internal cause and is periodical, it is hereditary, or depends on the deposition on the eye of a morbific principle difficult to be determined. The chief means to be employed are *sulphur*, *euphrasia*, *pulsatilla*, *cannabis*, *conium*, and *causticum*. *Belladona* might also be tried. *Calcarea carbonica* is useful in the case of turbid vision with a bluish tint of the cornea —the lids not being affected.

OTHER DISEASES OF THE EYE.

There is a singular disease of the eye, not properly ophthalmia, sometimes epizootic among cattle, that sadly frightens the owner when it first appears. Young cattle pasturing on wet and woody ground are suddenly seized with swellings of the tongue and throat, and eruptions about the membrane of the mouth, and the eyes become intensely inflamed, and superficial ulcers appear on the cornea. This is only one of nature's methods, singular indeed, of getting rid of something that offended the constitution; and the way is to let her nearly alone. The skillful practitioner foments with warm water,

or, if the eyes are closed, applies an evaporating lotion of cold water, with a little spirit, and possibly gives gentle physic; and he soon has the satisfaction to see the inflammation disappearing, and the ulcers gradually healing, which he hastens by a very weak zinc wash.

The ox is subject to Cataract, but it is not often seen, because periodical ophthalmia is not frequent in him; as soon as its existence is ascertained, the animal should be prepared for slaughter.

Gutta serena, or palsy of the optic nerve—blindness in one or both eyes, yet the perfect transparency of the eye preserved—is a rare disease among cattle; it is no sooner recognized than the beast is destroyed.

Cancer of the eye, or a perfect change of the mechanism of the eye into a fleshy, half-decomposed substance, that ulcerates and wastes away, or from which fungous growths spring that can never be checked, is a disease of occasional occurrence. The remedy would be extirpation of the eye, if it were deemed worth while to attempt it.

There is a very curious disease of the eye. The common symptoms of ophthalmia appear, as injection of the conjunctiva, dimness of the cornea, weeping, and swelling of the lids; the inflammation increases; and, on close examination, a small white worm, about the size of a hair, and an inch in length, is found in the aqueous humor, that fluid which is immediately behind the cornea. It is evident that the only way to get rid of, or destroy this worm, is to puncture the cornea, and let it out; and this has been resorted to. In some cases, however, not many days pass before another worm makes its appearance, and the operation is to be performed a second time, and the ox eventually loses that eye. Three or four days before the appearance of the worms, one or two minute bodies, of a reddish-white color, are seen at the bottom of the anterior chamber of the eye. The disease appears about June, and is not seen after December.

FRACTURE OF THE SKULL.

One class of the diseases of the head to which cattle are exposed will fall under the title of compression of, or pressure upon, the brain. Although it is a curious fact, that portions of the external or cineritious part of the brain may be cut away without the animal being conscious of it, yet the slightest pressure cannot be made upon the brain without impairment of consciousness, or loss of the power of voluntary motion.

The very construction of the skull of the ox, which gives a degree of security from ordinary danger, deprives us of all means of relief, in case of compression of the brain from fracture, and therefore the animal should always be consigned to slaughter.

HYDATIDS AND TUMORS IN THE BRAIN.

Cattle are subject to a disease in which the animal goes round and

round. First, some degree of fever comes on—she perhaps scarcely eats—rumination is suspended—the muzzle dry—the ears and roots of the horns hot—the breathing laborious, and the hair rough. It is fever without any evident local determination. Perhaps she is bled and physicked; but on the following day, the thing begins to speak for itself; she turns round and round, and always in the same direction: it is pressure upon the brain; no operation can relieve such an animal from the hydatid. But is the pressure of the hydatid the only one that can affect the brain, or produce this peculiar motion? Would not effusion of blood, or of any fluid, on some portion of the brain, produce the same effect? There may have been a too great determination of blood to the head, and some little vessel may have given way. It is worth trying for a day or two at least, and the cow will not be much the worse for slaughter in that time. She should be bled copiously; and a stronger dose of physic be given. In some instances, perhaps in the majority, the animal will do well. A spare diet at the time, and a while afterwards, will be plainly indicated. Success will not, however, attend every case.

It is a disease peculiar to young cattle. It seldom attacks any beast after he is a year and a half old.

Veterinary writers, in those countries where the hydatid in cattle is known, very properly remark that it may be discovered in young stock, by the softening of the bone at a particular part; because the frontal sinuses are not fully developed in young beasts. The hydatid may then be punctuated with an awl, or better with the trephine; but we recommend that *young cattle* thus affected should be immediately destroyed.

WATER IN THE HEAD.

There is another species of pressure on the brain, to which young cattle are subject, and sometimes even in the fœtal state—HYDROCEPHALUS, or water in the head. The fluid is usually found between the membranes, and exists in so great a quantity, and enlarges the head to such a degree, that parturition is difficult and dangerous; and it is often necessary to destroy the progeny to save the mother.

We have seen hydrocephalus appear after birth in very weakly calves; but do not recollect an instance in a healthy one; and in almost every case it has been fatal: therefore such an animal should be put to death.

In the adult animal, the pressure of a fluid on the brain will occasionally be a source of general disease, or death: but it will then be an accumulation of fluid in the ventricles of the brain, and not indicated by any change in the size or form of the skull. The symptoms will very much resemble those of apoplexy, except that they are milder, and the malady is slower in progress—and the network of minute arteries and veins in the ventricles are usually considerably enlarged.

APOPLEXY.

Cattle are very subject to sudden determination of blood to the head. They are naturally plethoric; are continually under the influence of a stimulating and forcing system; and that without exercise by means of which the injurious effects of that system might in a great measure be counteracted. The very object in our management of the ox, is to clothe him with as much flesh and fat as possible; therefore he is subject to all the diseases connected with a redundancy of blood, and to apoplexy among the rest.

There are few premonitory symptons in these cases. Had the beast been closely observed, it might have been perceived that he was indisposed to move—that the breathing was a little laborious, and the eye somewhat protruded. *The animal seems to be struck all at once*—he falls—breathes heavily and stertorously—struggles with greater or less violence, and then dies—sometimes in five minutes—oftener after a few hours.

If there is time to do any thing, the beast should be bled, and as much blood taken as can be got. A pound and a half of Epsom salts should be given, and this followed up with doses of half a pound until it operates; its action should afterwards be maintained by six-ounce doses of sulphur every morning.

The congestion of the brain being removed, and also the congestion which, to a certain degree, prevails everywhere, the beast should be slaughtered; for he is liable to a return from causes which would not, previous to his first attack, have in the slightest degree affected him.

Homœopathic treatment.—As soon as the precursory symptoms are perceived, a few doses of *aconitum* are given, which has been found a sure means of preventing a fatal termination, especially if the beast be fed moderately, employed properly, and not worked too severely during hot weather. *Arnica, belladonna, nux vomica,* and *laurocerasus* may also be used in the premonitory symptoms with good effect; also *mercurius* and *opium.*

PHRENITIS.

Phrensy or sough in cattle is well known to the farmer and practitioner. There is generally, at first, much oppression and heaviness; the animal can scarcely be induced to move; the eyes are protruded and red; the respiration hurried; and delirium, more or less intense, rapidly succeeds. The beast rushes at everything in its way; it is in incessant action, galloping about with its tail arched, staggering, falling, bellowing; its skin sticking to its ribs, and the sensibility of the spine strangely increased.

As, however, the previous oppression and stupidity were much less, so is the succeeding violence increased; not even a rabid ox is

more fearful, and it is somewhat difficult to distinguish between these two diseases. In the early stage of phrenitis, although there may be lowness or oppression, there is nothing like apoplexy, or want of consciousness. There is more method in the madness of the rabid than the phrenitic ox. The latter will run at everything which presents itself, but it is a sudden impulse; the former will plot mischief, and lure his victims within his reach. Much more foam will be discharged from the mouth of the rabid than the phrenitic ox.

The causes are much the same as those of apoplexy, too stimulating food, and too much blood; to which may generally be added some immediately exciting cause, as hard and rapid work in sultry weather, over-driving, &c.

As to the treatment of phrenitis there is some difficulty. If the beast can be approached during a momentary remission of the symptoms, bleeding should be attempted, and if a vein be opened, it should bleed on as long as it will. Physic, if it can, should be given. Sometimes the beast has insatiable thirst, and may be cheated with water in which Epsom salts have been dissolved. A scruple or half a drachm of farina of the Croton nut may be administered, mixed with gruel. All other medicines are out of the question. If bleeding and physic will not save, nothing will. Use should be made of any temporary respite to confine the animal, or to get him into some place where he cannot do harm to himself or to any one.

The phrensy being subdued, the next consideration is, what is to be done with the beast. No more dependence can be placed on him than on one recovered from apoplexy. Purging should be continued to a moderate degree, and fever medicine given to abate circulation; and when the congested blood is well out of the system, and the flesh has become healthy, the sooner the animal is disposed of the better.

The neck vein should be opened, on each side, if possible, and the blood should be suffered to flow until the animal drops. It is absurd to talk of quantities here; as much should be taken as can be got, of, at least, the blood should flow until the violence of the symptoms is quite abated.

To this a dose of physic should follow. The following may be administered:—

A Strong Physic Drink.—Take Epsom or Glauber's salts, half a pound; the kernel of the Croton nut, ten grains; take off the shell of the Croton nut, and weigh the proper quantity of the kernel. Rub it down to a fine powder; gradually mix it with half a pint of thick gruel, and give it, and immediately afterward give the salts, dissolved in a pint and a half of thinner gruel.

If the violence or even the wandering should remain, another bleeding should take place six hours afterwards, and this also until the pulse falters; and the purging should be kept up.

Although it is very difficult to produce a blister on the thick skin

of the ox, it should be attempted if the disease does not speedily subside. The hair should be closely cut or shaved from the upper part of the forehead and the poll, and for six inches on each side down the neck, and some of the following ointment well rubbed in:—

Blister Ointment.—Take, lard, twelve ounces; resin, four ounces; melt them together, and, when they are getting cold, add oil of turpentine, four ounces; and powdered cantharides, five ounces; stirring the whole well together.

When the blister is beginning to peel off, green elder or marsh-mallow ointment will be the best application to supple and heal the part. A little of it should be gently smeared over the blistered surface, morning and night.

A seton smeared with the above ointment may be inserted on each side of the poll, in preference to the application of a blister.

Although the violence of the disease, and of its remedies, will necessarily leave the beast exceedingly reduced, no stimulating medicine or food must on any account be administered. Mashes and green meat, and these in no great quantities, must suffice for nourishment, or, if the animal, as is sometimes the case, is unable to eat, a few quarts of tolerably thick gruel may be horned down every day; but ale, and gin, and spices, and tonic medicines, must be avoided as downright poisons. There is not a more common or a more fatal error in cattle management than the eagerness to pour in comfortable, one might rather say, poisonous drinks. Even the treacle and the sugar in the gruel must be prohibited, from their tendency to become acid in the debilitated stomach of the animal recovering from such a complaint.

Every symptom of the disease having vanished, the beast may *very slowly* return to his usual food; but, when he is turned to pasture, it will be prudent to give him a very short bite of grass, and little or no dry food. Nature is the best restorer of health and strength in these cases; and it is often surprising, not only how rapidly the ox will regain all he has lost, if left to nature, and not foolishly forced on, but how soon and to what a considerable degree his condition will improve beyond the state in which he was before the complaint.

The ox that has once had inflammation of the brain should ever afterwards be watched, and should be bled and physicked whenever there is the least appearance of staggers or fever. The safest way will be to send him to the butcher as soon as he is in sufficient condition.

Homœopathic treatment.—Aconitum is the first and chief remedy, before the disease is yet fully developed. It is given in frequent doses, separated by short intervals. When there is heat in the mouth, eyes, horns, and the animal rests its head against the wall or manger; or when, melancholy and almost devoid of consciousness, it allows it to hang; the best medicine is *belladonna*, to be given in repeated doses, especially when the look is frantic, with swelling of the vessels

of the head and pulsation of those of the neck. *Sulphur* should be given as consecutive treatment. *Hyoscyamus* is indicated, more especially when *belladonna* does not suffice. If there be suddenly a calm, stupor, or somnolence, or if the disease has been occasioned by insolation, *opium* is to be prescribed without delay. *Veratrum* is indicated when the animal throws itself about and places itself against the wall.

Sometimes the disease does not run its full course. There is but a slight degree of inflammation, or there may be sudden determination or flow of blood to the head, from some occasional cause, and without inflammation. This is known by the name of

STAGGERS; OR, SWIMMING IN THE HEAD.

The symptoms are heaviness and dullness; a constant disposition to sleep, which is manifested by the beast resting its head upon any convenient place; and he reels or staggers when he attempts to walk. If this disease be not checked by bleeding, purging, and proper management, it will probably terminate in inflammation of the brain or inflammatory fever.

It mostly attacks those cattle that have been kept in a state of poverty and starvation during the winter season, and in the spring of the year have been admitted into too fertile a pasture: hence is produced a redundancy of blood in the system, which, on the slightest disturbance, or even naturally, gives rise to the disease.

The cure must be attempted by taking four, five, or six quarts of blood from the animal, according to its size and strength; purging drink must then be administered, and continued in half-doses every eight hours, until the full purgative effect is produced. If the animal be not relieved in the course of two hours from the first bleeding, the operation must be repeated to the same extent, unless the beast should become faint; and the bowels must be kept in a loose or rather purging state. As soon as the bowels are opened, the fever drink should be given, morning, noon, and night, until the patient is well. Nothing more than a very little mash should be allowed, and all cordials should be avoided as absolutely destructive to the beast. When the animal appears to be doing well, he must return very slowly to his usual food; a seton should be put in the dewlap, and occasional doses of Epsom salts given.

Homœopathic treatment.—Belladonna is particularly useful at the onset of the disease; two or three doses are to be taken daily, until the symptoms have disappeared, after which the doses are to be given at longer intervals, and the treatment terminated with *sulphur*.

TETANUS, OR LOCKED JAW.

The nerves proceeding from the spinal chord are of two kinds, those by which the power of voluntary motion is conveyed to the

limbs, and those by which the impressions of surrounding objects are conveyed to the mind. First, of the diseases of the nerves of motion. There is a fluid or influence conveyed from the brain, through the medium of the spinal chord, to the various parts of the body, by means of which those parts are moved. In health that influence is communicated in a uniform succession of undulations, or pulses. In disease, it may rush on violently and without interruption; if that be only partial to a single muscle, or one set of muscles, the animal is said to be cramped; if this violent and uninterrupted action extend over the frame, he labors under tetanus; if the stream of influence be rapid and strong, but there are suspensions, he has fits; and if the nervous influence be altogether withheld, there is palsy.

Tetanus is not frequent in cattle, but it is seldom that a beast recovers from it. Its approach is rarely observed until the mischief is done. The animal is off its food, ceases to ruminate, is disinclined to move, and stands with its head protruded, but there is no dryness of the muzzle, or heat of the horn, or coldness of the ears. The next day the beast is in same state; has scarcely moved, and is straddling behind, can scarcely be induced to alter his position, and, if made to turn, turns all together. It is found that the jaw is locked; a discovery which might have been made two or three days before, when the ox might have been saved.

Working cattle are most subject to tetanus, because they may be pricked in shoeing; and because, after a hard day's work, covered with perspiration, they are sometimes turned out to graze during a cold and wet night. Overdriving is a common cause of tetanus.

The treatment must be the promptest; bleed until the pulse falters, or rather until the patient blows, staggers, and threatens to fall. There is nothing so likely to relax spasm of every kind, and even this excessive and universal one, as bleeding almost to fainting. Twenty, and even twenty-four pounds have been taken, before the desired effect was produced, and those cases oftenest do well, when the constitution resists the bleeding long, and then gives way.

One effect, not always lasting enough, follows the bleeding; the spasm is somewhat relaxed, and the jaws can be opened a little. Advantage must be immediately taken of this to pour in a dose of physic. That which is most active, and lies in the smallest compass, is the best; and half a drachm, or two scruples of farina of the Croton nut should be given in gruel, with, if it can be administered, or as soon as it can, a pound or a pound and a half of Epsom salts in solution. This must be followed up until the bowels are well opened. All other means will be thrown away until brisk purging is produced. There is sometimes a great difficulty in this. The direction which a fluid takes, or the stomach into which it goes, is uncertain. It may pass on at once through the third and fourth stomachs, and produce its effects on the bowels; or it may accumulate in the paunch, with-

out any effect. The manner in which it is given may have some influence. If there be great hurry to take advantage of the relaxation of the spasm, and pour down the whole drink quickly, in one body, it is very likely to find its way into the paunch. If the medicine be given a little at a time, or suffered to run gently down the throat, it will probably flow into the fourth stomach and the intestinal canal.

The bowels must be opened. After the first dose of Epsom salts and Croton farina, half-pound doses of salts should be given every six hours until the desired effect is produced; but after the first day, the Epsom salts may be changed with advantage for common salt. Injections should be administered every third hour, (four or six quarts at least,) and in each half a pound of Epsom salts should be dissolved. If four or six doses of medicine have been given, and the animal continues constipated, the pulse, ear, and horn should be examined as to the degree of fever; and if any is indicated, and if the pulse does not plainly denote debility, a second bleeding must be resorted to, and carried on until the circulation is evidently affected.

If the animal still remains constipated, the physic is accumulated in the paunch; and that stomach is not disposed to act. Strong doses of aromatics and tonics must now be added to the physic, to rouse the paunch to the expulsion of its contents, and should that fail, recourse must be had to the stomach pump. The œsophagus-tube must be introduced into the gullet, and carried down into the rumen, and warm water must be pumped in until that stomach overflows; and then the contents will either be vomited, or pass through the third into the fourth stomach, and so into the intestines, and the purgative effect will follow. This instrument is invaluable; and on the smallest farm, would soon repay the expense.

Purging being established, an attempt must be made to allay the irritability of the nervous system by sedatives; and the best drug, and the mainly effectual one, is opium. The crude opium dissolved in warm water, and suspended by means of dissolved gum or the yolk of an egg, will be the preferable form in which to give it. The dose should be a drachm three times every day, and increased to a drachm and a half on the third day, if the effect of the smaller dose be not evident. At the same time the action of the bowels must be kept up by Epsom salts, common salt, or sulphur, and the proportions of the purgative and the sedative must be such that the constitution shall be under the influence of both. It may be necessary to suspend the sedative for a dose or for a day, when costiveness threatens. The animal should be supported by mashes, which it will sometimes eat, or at least suck the moisture from; and as soon as there is any remission of the spasm, the beast may be turned in a field near at hand during the day, and taken up at night.

A seton of black hellebore root in the dewlap may be of service. It is introduced into a part not under the influence of the disease,

and it often causes a great deal of inflammation and swelling. The back and the loins may be covered with sheepskins, frequently changed, to excite constant perspiration, and produce relaxation in the part principally attacked: but the chief dependence should be on the copious bleeding at first; a recurrence to it if the spasm becomes more violent, or fever appears; and the joint influence of the sedatives and purging.

If the disease terminates successfully, the beast will be sadly out of condition, and will not thrive very rapidly, He must be got into fair plight, as quickly as prudence will allow; and then slaughtered; for he will rarely stand work afterwards, or carry much flesh.

Strong Physic Drink for Locked Jaw.—Take Barbadoes aloes, one ounce and a half; the kernel of the Croton nut, powdered, ten grains. Dissolve them in as small a quantity as possible of boiling water, and give when sufficiently cool.

Generally the jaw will be now sufficiently relaxed to permit the introduction of the thin neck of a claret bottle into the mouth. The best method, however, of giving medicine in this case is by the assistance of Read's patent pump, the pipe of which, let the jaws be fixed as firmly as they may, can generally be introduced, close to and immediately before the grinders.

Anodyne Drink for Locked Jaw.—Take camphor, one drachm, rub it down in an ounce of spirits of wine; to this add powdered opium, one drachm, and give the mixture in a small quantity of thick gruel.

This medicine should be administered three or four times every day; care being taken that the bowels are kept open, either by means of aloes or Epsom salts.

The bleeding should be repeated on the second day, if the animal be not evidently relieved; and as much blood should be again taken as the patient can bear to lose.

The stable or cow-house should be warm, and the animal covered with two or three thick rugs. If considerable perspiration can be excited, the beast is almost sure to experience some relief.

It will be almost labor in vain to endeavor to stimulate the skin, or to raise a blister. Two, three, or four setons in the dewlap have been useful; and benefit has been derived from shaving the back along the whole course of the skin, and cauterizing it severely with the common firing-iron. If it should be found impracticable to administer either food or medicine by the mouth, they must be given in the form of clysters. Double the usual quantity of the medicine must be given, on account of the probable loss of a portion of it, and the small quantity that the absorbents of the intestines may take up; but too much gruel must not be injected, otherwise it will probably be returned. A quart generally will be as much as will be retained, and the clyster may be repeated five or six times in the course of the day.

Should the progress of the disease have been rapid, and the symp-

toms violent; or should it be found to be impossible to give medicines by the mouth, or cause them to act by injection, the most prudent thing will be to have recourse to the butcher. The meat will not be in the slightest degree injured, for it is a disease that is rarely accompanied by any great degree of fever. There have been cases of cure of locked jaw by the use of cold water; it is to be applied in a stream (the *douche*), with some little fall along the back from the head to the tail, and continuously for hours if necessary. Relaxation will occur sooner or later. This may be added to other means.

Homœopathic treatment.—Nux vomica has proved very efficacious. It is administered in repeated doses, at first several times a day, then every two or three days. If any rigidity remain in the limbs, *arsenicum* is prescribed, after which it is right almost always to recur to *nux vomica*. In some cases where the animal had not recovered appetite, benefit has been obtained from *ipecacuanha*. *Belladonna mercurius vivus*, and *veratrum* have also been useful.

EPILEPSY.

This is of rare occurrence, but not easy to treat when it appears. It attacks animals of all ages, but chiefly those under three years old. There are few symptoms of the approach of the fit, except, perhaps, a little dullness or heaviness. All at once, the beast staggers—falls; sometimes he utters the most frightful bellowings; at others he make no noise, but every limb is convulsed; the heaving of the flanks is particularly violent, and would scarcely be credited unless seen; the jaws are either firmly clenched, or there is grinding of the teeth, and a frothy fluid is plentifully discharged from the mouth, mixed with portions of the food, which seem to have been prepared for rumination. The fæces and the urine flow involuntarily.

Sometimes these symptoms do not continue more than a few seconds; at others the fit lasts several minutes, and then the convulsions become less violent—gradually cease, and the beast gets up, looks about, seems unconscious of what has happened—at length begins to graze as before.

This disease is usually to be traced to some mismanagement with regard to the food. It oftenest attacks young cattle in high condition, who have lately been turned on better pasture than usual, or who have been exposed to some temporary excitement from overdriving, or the heat of the weather. It is a species of vertigo, or staggers—a sudden determination of blood to the head; and if the farmer does not take warning, mischief will result.

A very serious part of this business is, that the *habit* of fits is soon formed. The first is frequently succeeded by a second, and at length three or four will occur in a day.

Bleeding, physic, and short feed will be the treatment; and the last the most important. If the beast were designed for market, it will be prudent to hasten that time.

Homœopathic treatment.—Some doses of *aconitum* are the first means to be employed; after which we should administer *stramonium*, and, if the fit return, *belladonna*. We may also have recourse to *hyoscyamus*, (especially if the fits are accompanied with violent movements of the thighs,) also to *cocculus* and *calcarea carbonica*. It will be useful to try some doses of *camphor* every week, to prevent the return of the fits. If the disease depend on worms, as has been sometimes found, *china* is one of the most useful remedies for it.

PALSY.

There are many low, woody, marshy situations, in which cattle are subject to palsy. It is frequent during a cold, ungenial spring; and sometimes it assumes the character of an epizootic. Old beasts, and those that have been worked, are particularly subject to it; and especially when they are turned out during a cold night, after a hard day's work. A damp and unwholesome cowhouse, from which the litter is rarely removed, but putrid effluvia mingle with the vapor that is continually rising, is a fruitful source of palsy, and especially if to this be added the influence of scanty and bad food and stagnant water. Old cows, whose milk has been dried and who cannot be made to carry much flesh, are very subject to this complaint.

Palsy is usually slow in its progress. There appears to be general debility; perhaps referable to the part about to be attacked more than to any other; and a giving way, or trembling of that part, and sometimes, but not always, a coldness of it. The hind limbs are most frequently attacked. It is at first feebleness, which increases to stiffness, to awkwardness of motion, and at length to total loss of it. The fore limbs are sometimes the principal seat of the disease, but then the hind limbs always participate in the affection. In no case is there any affection of one side and not of the other; this is a difference in palsy in the human being and the brute, for which we cannot account.

Sometimes this complaint is traced to a ridiculous cause. The original evil is said to be in the tail; and it is thought that the mischief passes along the cow's tail to the back, and that it is on account of something wrong in the tail that she loses the use of her legs: some cut the cow's tail off; others, less cruel, make an incision into the under surface, and allow the wound to bleed freely, and then fill it up with a mixture of tar and salt. Is not relief sometimes given by these operations on the tail?—probably. What would make a cow get up and use her limbs if the knife, and the rubbing-in of tar and salt failed; the loss of blood would often be beneficial, but not more from the tail than from any other part.

The most frequent cause of palsy is the turning out of beasts of every kind, but particularly cows, too early to grass, after they have been housed during the winter and first part of the spring. One-fourth of the stock is sometimes completely chilled and palsied behind in the course of two or three nights. The general health will not be much affected, except that, perhaps, hoose comes on; but the beasts will lay three or four weeks before they recover the use of their limbs.

The treatment of this disease may be summed up in one word—*comfort.* The cattle should, if possible, be immediately removed into a warm, but not close, cow-house, and well littered, and a rug thrown over them, turned twice in the day, and so laid that the fæces and urine will flow from them.

Physic should be first administered. This species of palsy is usually attended by considerable constipation, *which must be overcome;* but with the physic, a good dose of cordial medicine should always be mixed. Give an ounce of powdered ginger, and a half pint at least of good sound ale. Except in diseases of a decidedly inflammatory nature, or of such a state of nervous irritability as tetanus, the physic of cattle should be mixed with aromatics, and frequently with ale. It is to the administration of these cordials in cases of fever that we object; no fuel should be then added to fire; but in general cases, with the constitution of the cow mild cordial medicine does not disagree.

In palsy, there is usually an indifference to food. This is reason for giving a little cordial with the physic. The beast should be coaxed to eat—the food which is in season should be offered to it, and frequently changed. Hand-rubbing, and plenty of it, should be used two or three times every day about the loins; a stimulating liniment may be applied, consisting of equal parts of spirits of turpentine, camphorated spirit, and hartshorn. The chief dependence is on keeping the bowels open, and the animal comfortable; and then in from ten days to a month he will usually get up again.

Strychnine would be worth a trial where the purgative comfortable system fails; but that succeeds so often, that we should be loth to have recourse to anything else in the first instance.

Homœopathic treatment.—The chief remedies to be used are: *aconitum, arsenicum, arnica, belladonna, bryonia, crocus calcarea, carbonica causticum, dulcamara, rhus toxicodendron, ruta, sulphur, ferrum, cinchona,* &c. If paralysis result from rheumatism, we should employ *arnica, ferrum, rhus, rhuta, lycopodium,* and *sulphur.* If from debility, *cinchona, ferrum, baryta, carbonica, sulphur,* and *calcarea.* If from apoplexy, *arnica, belladonna, bryonia, nux vomica,* &c. If from injury, *arnica, aconitum, dulcamara,* &c.

NEUROTOMY.

Veterinary surgeons, to relieve the pain which the horse must

otherwise endure from several diseases of the foot, cut out a portion of the nerve of the leg. This cannot interfere with the motion of the limb, because there are no muscles beneath the knee for the nerve to supply; but it cuts off the communication of the feeling of pain. If a nerve concerned with feeling be divided, the impressions, whether of pleasure or of pain, made on it, below the division, cannot be conveyed to the brain, and therefore the animal is totally unconscious of them. Many a valuable animal is thus relieved from torture, and perhaps his services are retained for many a year, and bulls useless from lameness are made fit for service.

The working ox is subject to several diseases of the feet, the consequences of shoeing and hard labor, and which are painful and difficult to treat. From the division of his foot, and the hardness and occasional inequality of the ground, and the consequent inequality of pressure on the two pasterns, he is subject to sprains of the fetlock joint, and injuries of the shank-bone. Enlargements of the lower head of these bones are frequently found in the ox. With these diseases, the animal is capable of little work, and will not carry much flesh. There are diseases natural to cattle, which are productive of a great deal of pain, and materially lessen the profit derived from them. Cows have lost, for a time, full half of their milk, on account of the pain of tender or diseased feet. The advantage of three and four months' feeding from the same cause is often lost. In the London dairies tender feet is often a most serious ailment, and compels the milkman to part with some of his best cows.

Why should not neurotomy be resorted to? There is nothing difficult in it to any one acquainted with the anatomy of the part; and its beneficial effect cannot admit of dispute. It is free from any objection.

The operation is thus performed:—The ox is cast and secured, the hair being previously cut from the limb to be operated upon. The leg is then to be removed from the hobbles, and distended, and a tight ligature passed round it beneath the knee, to prevent bleeding. Then, on the centre of the back of the leg, (the cut, p. 176, No. 1, represents the left leg,) but a little inclining towards the inside, and about $2\frac{1}{2}$ inches above the fetlock, the artery will be felt for. Lying immediately inside the artery, towards the other leg, is the vein, and close to that the nerve; the nerve will be found about one-sixth part of an inch within the artery. The artery is recognized by its pulsation—the vein by its yielding to the pressure of the finger, and the nerve by its being a hard, unyielding body. The operator then makes a cautious incision, an inch and a half in length, over the nerve, taking care merely to cut through the integument. The cellular substance is dissected through, and the nerve exposed. A crooked needle, with silk, is next passed under it, to raise it a little;

it is dissected from the cellular substance beneath, and about three-quarters of an inch cut out; the first incision being made at the upper part, in which case the second cut will not be felt. There is only one nerve to be cut here, because the operation is to be performed a little above the branching of the nerve.

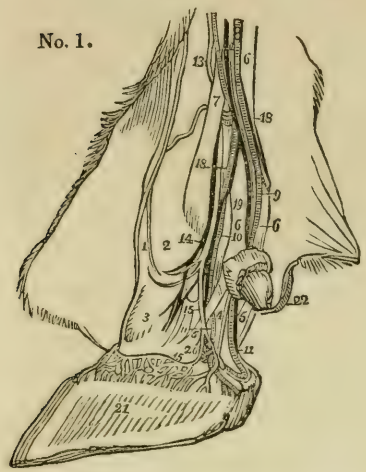
The edges of the wound are now brought together; a small bit of tow or lint is placed over them, and upon that a bandage is drawn tolerably tight. The wound should not be examined for the first three days, after which dress with healing ointment, or the tincture of aloes. In about three weeks it will be quite healed. The relief will be immediate, and the milk of the cow will return, or the grazing beast will begin to fatten in the course of a day or two.

The cut (No. 1) of the lateral and posterior part of the leg and foot of the ox, shows the distribution and relative situation of the blood-vessels and nerves of those portions of leg, fetlock, and foot. Besides these, there is only one superficial nerve accompanying the superficial vein down to the centre of the great metacarpal, or rather, in the young animal, the suture or union between the two bones, few or none of whose fibres extend below the fetlock, and which may be easily got at and divided in disease of that joint.

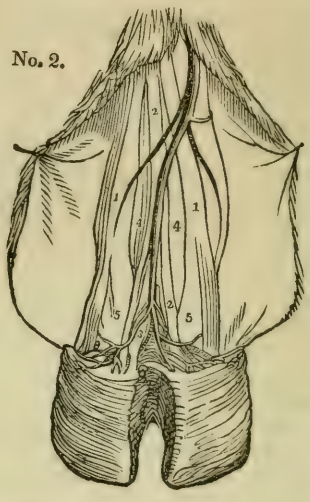
The cut (No. 2) shows how few nervous branches extend down the front of the lower part of the leg; and how completely the object of neurotomy will be accomplished by the division of the nerve at the posterior part of the leg, in the manner recommended. The figures illustrate the anatomy of the fore-part of the fetlock and pasterns of the ox. The nerves are represented by a plain black line, as in No. 1.

It will be seen from the cut, that there may be doubt as to the precise portion of the foot which is diseased, and the branch of the nerve which it will be proper to cut. There are the two lateral and the median trunks for the operator to choose from; but he who is wise, *when operating on a beast of draught or slow action*, will operate on the ox sufficiently above the fetlock, and rather above than below the situation marked 17 in the cut, and before the division of the nerve.

No. 1.



No. 2.



LEG AND FOOT OF THE OX.

No. 1.

1. The tendon of the extensor of the foot.
2. Caspular ligaments of the fetlock joint.
3. Capsular ligaments of the pastern joint.
4. Tendon of the perforans muscle.
5. Ligamentous portions.
6. Tendons of the perforans and perforatus muscles.
7. Division of the tendon of the carpo-phalangeus.
8. The lateral external artery of the canon, or shank.
9. The mesian and posterior artery of the fetlock.
10. The lateral internal artery.
11. The posterior branches of the plantar arteries.
12. The lateral external vein of the canon.
13. The lateral internal vein of the canon.
14. The lateral vein of the pastern.
15. A branch which is formed by the plantar veins, and the venous reservoir of the plantar.
16. The vascular reservoir, covered in part by the coronet.
17. The plantar nerve before its bifurcation.
18. Nervous branches, which, after having parted from the preceding, take a direction, the one backward and downward to the lateral and external part of the fetlock, and the other downward to the internal part of the same joint.
19. The mesian division of the same nerve. It pursues its course by the artery of the same name.
20. A continuation of the plantar nerve, accompanying the internal lateral artery.
21. The sensible laminæ of the coffin bone, corresponding with the horny laminæ of the hoof.
22. The usual horny excrescence at the posterior part of the fetlock.

No. 2.

1. The tendons of the extensor of the pastern below the bifurcation.
2. The tendons of the extensor of the foot.
3. Internal lateral ligaments.
4. Capsular ligaments of the fetlock joint.
5. The capsular ligaments of the pastern joints.
6. A portion of integument, which unites the two hoofs at their superior and internal part. The blood-vessels brought principally into view, are, the superficial veins of the leg above; the anastomosis of the profound and superficial veins below, between the figures 2, 2; and the superficial plantar arteries and veins, still lower down.

RABIES.

There is one more disease of the nervous system, the most fearful of the list, viz., RABIES. When a rabid or mad dog is wandering about, if his road lies by cattle he will attack the nearest to him, and if he meets with much resistance he will bite as many as he can.

When there is suspicion that a beast has been bitten, the wound should be carefully searched for, and being discovered, the hair must be cut from the edges of it, and lunar caustic (nitrate of silver), the stick being reduced to a point, introduced into it, and brought in contact with, and made thoroughly to act upon, every part of it. If there be doubt about the caustic coming into contact with every part of the wound, it must be enlarged with the knife, so as to give free access to it; and the caustic being freely used upon the whole of the wound, the beast is safe. But who, on an animal thickly covered with hair, will say that there is no other wound? The slightest scratch, neglected, is as dangerous as a lacerated wound.

In this state of uncertainty, therefore, the farmer must look out for the worst. If the disease appear, it will be about the end of the fifth week, although there will be no absolute security in less than double the number of months.

The beast will appear dull, languid, feverish, scarcely grazing, and idly ruminating. These may be symptoms of many a different illness, and the previous circumstances alone could excite suspicion of what is to follow. The eyes become anxious, protude, red—there is considerable discharge of saliva, and to this succeeds a thirst that can scarcely be quenched. There is no dread of water at any time. It cannot be too strongly impressed on the mind, and may preserve from danger, anxiety, and fear, him who has to do with domesticated animals of any kind—that the constant and characteristic dread of water is confined to the human being. The ox may exhibit a momentary dislike to fluids, but generally will drink to the last, and the desire of water is increased rather than diminished by the disease.

In the ox, the disease, from some cause unknown, takes on two essentially different characters. The symptoms that we have mentioned are succeeded by frequent pitiful lowings, and a continual and painful attempt to evacuate the fæces. Staggering and weakness of the loins appear on the second or third day, and this is soon succeeded by palsy of the hinder extremities. The animal sits on its haunches, making ineffectual attempts to rise—looking wofully around it, and eagerly plunging its muzzle into the water, when placed within its reach, but it makes no attempt to do mischief. At other times, the early symptoms are succeeded by a dreadful state of excitation. The animal is eager to do every kind of mischief; he stands across the path, bellowing incessantly, and tearing up the ground with his horns. In a few cases, the quiet and melancholy

madness suddenly changes into that of a ferocious character. There is no cure now; and the animal should be destroyed. One circumstance also should be remembered. The poison in rabid animals seems to be in the saliva; and the saliva of an ox is as dangerous as that of a dog.

The rabid ox may attempt more mischief with its horns than its teeth, but occasionally will bite; or, if not, yet must not be meddled with too much. This dangerous foam is continually running from the mouth; it may fall on a sore place, and it is then as dangerous as a bite.

The knowledge that the virus is confined to the saliva will settle another matter. A cow may be observed to be ailing for a day or two, but has been milked as usual; her milk has been mingled with the rest, and has been used. She is discovered to be rabid. Can the milk of a rabid cow be drunk with impunity? Yes, for the poison is confined to the saliva. Miscreants have sent the flesh of rabid cattle to market, and it has been eaten without harm.

Homœopathic treatment.—A dose of *belladonna* is to be administered first; the bite is to be well washed, and fomented with water, to which some drops of extract of *belladonna* have been added. The doses of *belladonna* are to be repeated, first every day, then at longer intervals. When a mad dog has found his way into a herd, it is a good precaution to make all the beasts take a dose of *belladonna* daily, for eight or even twelve days.

CHAPTER X.

THE ANATOMY, USES, AND DISEASES OF THE NOSTRILS AND THE MOUTH.

The nasal cavity of the ox contains the apparatus for the sense of smell, and is also devoted to the purpose of respiration. It is one of the passages by which the air is conveyed to and from the lungs; but as the ox partly breathes through the mouth, there are found in the cavity of his nose contrivances for great perfection of smelling.

THE NASAL BONES.

From the great development of the frontal bones, in order to form a secure basis for the horn, all the bones of the face are proportionately diminished; and therefore the *nasal bones* in the ox (*b*, p. 143, *q*, p. 144,) are small. They are connected with each other, and with the frontals (*c*, p. 143 and *b*, p. 144), with the lacrymals (*c*, p. 143), with the superior maxillaries (*a*, p. 144 and *x*, p. 143,) and with the anterior maxillaries (*z*, p. 144). They are pushed down, and not being in a situation of danger, there is not any intricate and mortoised connection with any of the other bones except the frontals. They are broad in proportion to their length; and as, on account of the construction of the mouth of the ox, the muzzle was destined to be broad, each bone terminates in two points, with a hollow between them; and as the inside points of the two lie in contact with each other, the nasal bones may be considered as actually ending in three points instead of one, and occupying a considerably-extended surface. It is thus wide, for the greater attachment of muscle and cartilage; for the muzzle must be broad and thick and strong, in order to compress and hold the grass firmly, until it is partly cut and partly torn by the pressure of the incisors of the lower jaw on the pad which occupies the place of the teeth in the upper one.

If the nasal bone be closely examined, it will be found that it does not consist, in its under surface, of one continuous arch, but that there is a channel hollowed out of it, and running along the crown of the arch. It can be seen above (*r*, p. 144.) This is an addition to the upper meatus or passage of the nose above the upper turbi-

nated bone, and which has nothing to do with the act of breathing, but terminates in a blind pouch, so that the air shall, as it were, loiter there, and any odor which it carries, make a stronger impression on the membrane of the nose. Therefore, and for other reasons that will be stated, the ox has an acute sense of smell.

THE OTHER BONES OF THE NOSE.

The *superior maxillary* bone forms the greater part of the wall and floor of the nasal cavity. It contains the upper grinders on either side. Its floor does not consist of a single plate of bone, but of cells, like those of the frontal parietal and occipital bones. This bone is represented at *a*, p. 143 and *x*, p. 144.

The *anterior maxillary*, (*z*, p. 144.) containing no incisor teeth, is a very small bone.

The *palatine bone* (*p*, p. 144) is large in the ox, and occupies a great portion of the palate and the floor of the nose.

CONTENTS OF THE NASAL CAVITY.

The nasal cavity contains the *septum*, a cartilaginous division extending from the suture in the roof between the nasals, to a long bone in the form of a groove, named the vomer, and placed on the floor; and from the top of the nasals to the æthmoid bone, dividing the nose into two equal parts. There is no necessity for this perfect division, and therefore the vomer, when it has reached about half way up the cavity, begins to leave, and separates from the floor more and more as it approaches the posterior part of the nostrils, leaving a free and extensive communication between them. This gives room for still more effectual provision for the perfection of the sense of smell.

THE SENSE OF SMELLING.

The *olfactory*, or first pair of nerves, connected with the sense of smelling, is abundantly large in quadrupeds, for it is connected with life itself. The same nerve differs in size in different quadrupeds, according to the necessity that each has for an acute sense of smell. The brain of the ox is not more than half the size of that of the horse, but he has occasion for acuter smell, and his olfactory nerve is nearly as large as that of the horse; and, comparing the bulk of the two brains, it is a great deal larger. This nerve comes in contact with a thin plate of bone, the *cribriform* plate (perforated like a cullender,) of the æthmoid bone, which divides the nasal cavity from that of the skull; the somewhat thickened portion of another bone interposed between these plates is seen at *n*, p. 144. The pulpy matter of the nerve is pressed through the holes of this bone, and spread over a portion of the membrane of the

nose. It is the impression which is made by the odor of bodies striking on this diffused pulpy matter, that produces the sense of smell; and in proportion to the extent of surface over which the nerve is spread, is the acuteness of the smell.

The ox partly breathing through the mouth, and the air passage being widened by the removal of a portion of the septum, provision can be made for the more extensive diffusion of the nervous pulp. Nearest to the skull, and situated at the upper part of the nasal cavity, are the cells of the æthmoid bone, (*r*, p. 144,) and the superior development of them in the ox is evident. The lower cell of the æthmoid labyrinth is so much lengthened in the ox, that it is sometimes described as a third turbinated bone. It is represented at *u*, p. 144. Below these are the two turbinated bones, (*s* and *t*, p. 144,) both of them, and especially the lower one, largely developed. Each of these bones is composed of a labyrinth of cells, divided from each other by wafer-like plates of bone, perforated like the cribriform plate of the æthmoid bone—lined by the Schneiderian membrane, with the nervous pulp spread over or identified with that membrane—and a thousand communications between the membranes in every part, by means of the gauze-like perforated structure of the plates.

This membrane is either covered with an unctuous fluid, or the air passages are so complicated that the pure atmospheric air alone is suffered to pass; the slightest odor or solid substance of any kind is arrested. This is not only a wise provision for the perfection of the sense of smelling—it not only secures the contact of every particle with the membrane of the nose, and its temporary lodgment there, but it protects the air passages from many a source of annoyance, danger, and death.

Nature has provided an acute sense of smell for the ox: it was wanted. It was necessary that the animal should detect the peculiar scent of every plant, as connected either with nutrition or destruction. Instinct perhaps teaches him much, but he is more indebted to the lessons of experience. In the spring of the year, when the scent of the infant plant is scarcely developed, cattle are often deceived with regard to the nature of the herbage; are subject to peculiar complaints of indigestion; and are sometimes poisoned.

BLEEDING FROM THE NOSE.

Working oxen, and especially those in tolerably high condition, are occasionally subject to bleeding from the nose, and sometimes very profuse bleeding. If too hardly and too long worked during the heat of a summer's day, nasal hæmorrhage may occur; to blows inflicted on the nasals or on the muzzle by a brutal drover or ploughman, far oftener than to any other cause, is bleeding due. It is not often that any unpleasant consequences ensue. The bleeding gradually ceases.

LEECHES IN THE NASAL CAVITY.

Often leeches fasten on the muzzle, and then creep into the nostril of the ox, when drinking at a stagnant pool. One of these blood-suckers having introduced himself into the cavity, will usually shift from place to place, biting here and there, and causing a very considerable hæmorrhage. The beast will tell us plainly enough the cause of the bleeding, by the uneasiness which he will express, and by his continually snorting and tossing his head about.

On examining the nostril in a good light, the leech may sometimes be seen. Cover the end of the finger with a little salt, and introduce it sufficiently high to detach the blood-sucker from his hold. At other times when a leech is suspected, salt and water may be injected up the nostril. When he is fully bloated, he will detach himself; and, except he has crept up the superior meatus, through which there is no air passage, he will be expelled by the sneezing of the ox. Only temporary inconvenience can result, for the bleeding will stop, even from so vascular a membrane as that of the nose.

POLYPUS IN THE NOSE.

This is a rare disease in the ox. Polypi should be removed by a ligature round the pedicle, and as near to the root as possible, or by tortion, and by the former whenever it can be effected.

CORYZA.

By this is meant inflammation of, and defluction from, the nasal cavity, or the cells with which it is connected; the same affection on the fauces, becomes catarrh. Catarrh is usually connected with coryza, and is the natural consequence or progress of it; but simple coryza does occasionally exist in the ox. We are too often frightened by a discharge from the nostrils, mucous, purulent, fetid, and excoriating, and *unaccompanied by cough.* It is seen in crowded and over-heated cow-houses; it arises from imprudent exposure to extreme cold, and it is frequently produced by the dust and gravel of the road. The ox was not designed to be exposed to the last annoyance; and he has no false nostril to turn off the current of minute and irritating particles from the more susceptible parts of the nasal cavity. Therefore, oxen driven any considerable distance to fair or market, in sultry, dusty weather, usually suffer from coryza. Dairymen, whose cows have to travel half a mile or more on a dusty road, wonder that, with all their care, their cattle should have such frequent discharge from the nose, and that this should sometimes run on to hoose. The cause is plain enough, although little suspected.

There is a periodical coryza in cattle. During the winter season, and probably from mismanagement—from undue exposure to cold,

or to the extremes of heat and cold, there is considerable nasal gleet, not interfering much with health, but unpleasant to the eye and annoying to the animal, and which, in despite of the most careful treatment, will remain. When, however, the warmth of spring returns, it sometimes gradually disappears. This, however, is one of the most favorable cases; for it will occur that, from some improper management, hoose or cough has gradually become connected with the nasal discharge. The farmer has not observed this connection, nor is he alarmed although the cough should remain when the nasal discharge ceases: nay, he cares little about it, although the cough should be a frequent and harrassing one, if the beast does but carry its usual flesh, and yields its full quantity of milk: when, however, the milk fails, and the cow begins to lose condition, he, for the first time, looks about him, and then it is too late.

We are now, however, speaking of coryza—inflammation of, and discharge from, the membrane of the nose. It is a matter of the utmost importance for the attendant upon cattle, to assure himself that it is simple coryza. He should carefully examine whether there be any cough, especially whether that cough be painful—any increased labor of breathing—any diminution of appetite—suspension of rumination—fever? The pulse, felt at the left side, and the temperature of the root of the horn, will best ascertain this last particular.

If there be nothing of these, still we have inflammation, and of a character that soon connects itself with some or all of them; therefore a mash may be given in the evening, and a few doses of cooling medicine.

The best fever medicine for cattle is half a drachm each of powdered digitalis and emetic tartar, and two drachms each of nitre and sulphur, which will constitute the medium fever-powder, to be given as occasion may require, and increased or diminished in quantity, according to the size and age of the beast, and the intensity of the disease. This should be given in the form of drink.

If it be simple coryza, add half a drachm of sulphate of copper (blue vitriol,) finely powdered, to the other ingredients. This drug seems to have a peculiar and a very beneficial termination to the mucous membrane of the nose and its connecting cavities, and is very useful in pure inflammation or ulceration of that membrane, or discharge from it. A very slight degree of hoose, and particularly of painful hoose, is a sufficient indication that the fever-powders alone are to be used.

Coryza may degenerate into catarrh, bronchitis, or inflammation of the lungs; the proper treatment will be indicated when those diseases are taken into consideration.

GLANDERS AND FARCY.

Of these dreadful diseases we have never met with a case in cattle.

It is not a point fairly settled, and deserves peculiar attention from the proprietors of cattle. Our decided opinion is that cattle are exempt from glanders and farcy.

THE BONES OF THE MOUTH.

The sides and the greater part of the roof of the mouth are formed by the *superior maxillary*, or upper jaw, seen at *a*, p. 143, and *x*, p. 144. This bone is materially diminished in size by the great development of the frontal bones. It articulates with the lachrymal bone at *c*, p. 143, and the malar bone at *d*. For the attachment of the masseter muscle, the surface of the bone is roughened and tuberculated. Immediately above the foremost of the upper grinders in the cut of the skeleton, p. 143, is a little black mark, representing the foramen, or hole through which the nerves and blood-vessels proceed to the lower part of the face.

The superior maxillary consists of two plates, irregularly separated from each other; the outer forms the external, and the other the internal wall of the mouth, as seen at *x*, p. 144; extending upward, and assuming an arched form, the commencement of which is seen at *x*, it constitutes the greater part of the bony roof of the mouth. The inferior cells of the external part contain the back teeth, or grinders; the superior ones are the maxillary sinuses; and in the ox there is a new set of cells, formed by a separation of the plates of the bone, between the roof of the mouth and the floor of the nasal cavity.

The *palatine* bone, *p*, p. 144, occupies considerably more of the roof of the mouth than it does in the horse.

The *anterior maxillary* bone is a very insignificant one; there are no tusks, or incisor teeth. There are likewise considerable apertures, one of which is seen between *x* and *z*, p. 144, which leave a somewhat extensive part of the roof of the mouth and floor of the nose occupied only by cellular substance and membrane. There is little strength required in the part, and therefore there is little provision for it.

At the base or floor of the mouth is the *inferior maxillary*, or lower jaw (*j*, p. 143.) It partakes of the shortness of the bones of the face. It contains the only incisor teeth which cattle have, eight in number, and six molar teeth on each side. It goes back straight to the angle, where it turns to take an upper direction towards its joint with the temporal bone. The consequence of this is, that the muscles, both on the inside and the outside, are small and weak. Power is not wanted; for the grinders are little if at all used in the first gathering and mastication of the food, and the act of rumination is generally very leisurely and lazily performed.

Below *g*, p. 143, is seen the process of this bone, round which the temporal muscle is wrapped, and by which it is moved; and a little lower is the shallow cavity of the temporal bone, into which the

proper head of this is received, and with which it forms a joint. The ridges at either end of this cavity are very low, to allow more latitude of motion, and admit of the grinding action by which rumination is principally characterized. The muscle, being inserted so near to the joint, acts with great mechanical disadvantage; but it is sufficiently powerful for every purpose that is required.

THE CHEEKS.

The outer walls of the mouth are the cheeks and lips. The cheeks consist principally of muscle, (the masseter and the buccinator muscles.) They are covered externally by the skin, and lined by the membrane of the mouth. There is considerable glandular substance in their composition, and these glands have distinct openings into the mouth, and assist in supplying it with moisture.

THE LIPS.

The lips form the anterior opening of the mouth; they close it, and assist in gathering and retaining the food. They consist of muscular, glandular, and cellular texture; and of much, in the upper lip especially, condensed substance almost resembling cartilage. The muscles give them the power of motion, and particularly that of forcibly seizing and compressing the food. This is especially necessary in the ox, because there are no upper front teeth, and for this purpose also the cartilaginous matter was added to them, and most of all to the upper lip. Simple muscular substance would be too yielding to retain the grass, when it is to be forcibly separated from the stalk or root. On account of this peculiar function of the upper lip of the ox, it is wide and flat, in order that it may be brought better into contact with herbage, and gather it in sufficient quantities.

Being so much employed for this purpose, there is a want of feeling about the lips of cattle, very different from acute sensitiveness. His muzzle is to be continually in contact with the ground, among smooth and rough herbage—things pleasing and annoying; and therefore all acute feeling is withheld from him, and, consequently, he is rarely seen using his lips as substitutes for hands, and forming his opinion of the objects around him by the indications which they afford him.

The excess of glandular substance in the lips of the ox is easily accounted for. They not only afford their share of the natural moisture of the mouth, but are, from situation, form, and use, exposed to various nuisances. Insects continually crawl about the muzzle, and dirt and gravel accumulate on it. If the grass is to be firmly held between the pad in the upper jaw and the teeth in the lower, and the upper lip must materially assist in the firmness of the grip, it

must be continually in contact with the ground, and cannot always be in the cleanest state. Nature has given the best of defences against this. The outer covering of the upper lip is thickly studded with glands, and a fluid can be seen pouring out from them. If an ox be watched, drops are seen coursing down his muzzle, and falling on the ground. The upper lip, in health, is always wet; the insect cannot easily fasten, nor dirt accumulate; or if the one adhere, or the other collect, the tongue is protruded, it passes over the moistened surface, and all is clear again.

We notice the secretion from these glands when we form a judgment of the animal, and the degree of disease. While the muzzle is moist, *i. e.*, while the natural secretions are going forward, there is no great constitutional disturbance, and consequently no great danger; in proportion as that secretion is lessened, there is general sympathy with some local affection; and when it becomes altogether suspended, it is an indication of much universal derangement. There is nothing more in this secretion than in any other, but it is easily observed, and the changes in it can be accurately marked.

THE MEMBRANE OF THE MOUTH.

This is thin and delicate, compared with the external integument. Every part of the mouth is lined with it, and it contains numerous glands, occasionally rising into little papillæ, from which a considerable portion of the usual moisture of the mouth is derived. The gums and the bars are covered by this membrane, but they are denser and less sensible.

THE BARS.

These consist of a firm substance, of a cartilaginous nature, adhering to the bones of the roof of the mouth, by numerous little cords, penetrating into these bones. They are hard and adherent, that the food may be rolled against the palate, and formed into proper masses for swallowing, whether in the first or second mastication. The palate is divided into numerous ridges running across the mouth, and on the posterior edge of which there is a fringed border, consisting of papillæ of much consistence and strength, and all pointing backward; so that the food is permitted to travel backward, in this process of formation into pellets, but cannot again get into the fore part of the mouth.

THE PAD ON THE ANTERIOR MAXILLARY BONE.

These bars are rather flat, hard, and irregular, and these papillæ at the edges of the bars are quite strong. The bars thicken towards the fore part of the mouth, and there they accumulate into a pad, or cushion, which covers the convex extremity of the anterior maxillary

bone. This pad is of a somewhat more fibrous and elastic nature than the bars, and stands in the place of upper incisor or cutting teeth. The grass is collected and rolled together by means of the tongue; is firmly held between the lower cutting-teeth and the pad, the cartilaginous upper lip assisting in this; and then by a sudden nodding motion of the head, in which the pterigoid muscles are the chief agents, the little roll of herbage is partly both torn and cut.

The intention of this singular method of gathering the food, it is difficult satisfatorily to explain. It is peculiar to ruminants, who have one large stomach, in which the food is kept as a kind of reservoir until it is ready for the action of the other stomachs. While kept there it is in a state of maceration, exposed to the united influence of moisture and warmth, and the consequence is, that a species of decomposition sometimes commences, and gas is extricated. That this should not take place in the natural process of retention and maceration, nature possibly established this mechanism for the first gathering of the food. It is impossible that half of that which is thus procured can be fairly cut through; part will be torn up by the roots; many a root mingles with the blades of grass; and these have sometimes much earth about them. The beast, however, seems not to regard this; he eats on, dirt and all, until his paunch is filled.

That this earth should be gathered and swallowed, was the meaning of this mechanism. A portion of absorbent earth is found in every soil, sufficient not only to prevent the evil that would result from occasional decomposition, by neutralizing the acid principle as rapidly as it is evolved, but perhaps, by its presence, preventing that decomposition from taking place. Hence the eagerness with which stall-fed cattle, who have not the opportunity of plucking up the roots of grass, evince for earth. When decomposition commences and the acescent principle begins to be developed, the animal feels uneasiness on that account, and has recourse to the earth; and the acid uniting itself to the earth, the uneasy feeling is relieved, and a purgative neutral salt manufactured in the paunch.

THE TEETH.

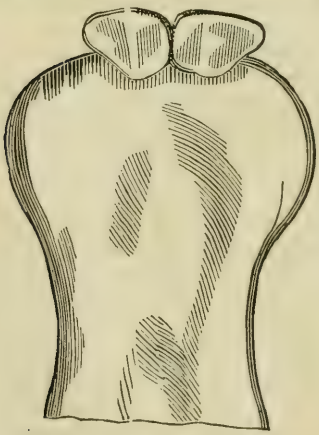
The mouth contains the principal agents in mastication, the teeth. The mouth of the ox when full contains thirty-two teeth; eight incisors in the lower jaw, and six molars in each jaw, above and below, and on either side. The incisor teeth are admirably adapted to perform their function. If there be no corresponding ones opposed, but merely an elastic pad, they must possess an edge of considerable sharpness in order to perform this half-cutting, half-tearing process. With a blunt edge there could be no cutting at all; but all the grass would be torn up by the roots, the pasture destroyed, and the animal choked with earth. The part of the tooth above the gum is

covered with enamel, both to produce and retain this necessary sharpness. The crown of the tooth, or that part of it which is above the gum, presents a surface somewhat convex externally, rising straight from the gum; while inside the mouth, it has a concave face, diminishing gradually in thickness as it recedes from the gum, and terminating in an edge, than which, in the young animal, few scissors are sharper. The elastic nature of the pad preserves itself from laceration; but the grass on which the animal is browsing, less elastic, is partly cut through.

The molar teeth are as well adapted for the mingled laceration and grinding of the grass. There are two oblique surfaces, those on the lower jaw taking a direction upwards, and from without inwards, and those in the upper jaw slanting in an opposite direction, while the surface of the tooth is sawed into deep grooves. There are three in the last molar, the edges of which, from cones of enamel sunk deep into the substance of the tooth, are sharp and cannot be meddled with without laceration, and these receive corresponding projecting portions from the opposite teeth. From the prolonged although leisurely action of machines like these, the food is reduced to a state of extreme comminution, that every particle of nourishment may be extracted from it. The ox, on whose flesh we subsist, must extract every particle of matter which the food contains, and therefore not a fibre is seen in the fæces. The dung, except from a stall-fed beast, is comparatively of little worth.

THE AGE OF CATTLE AS INDICATED BY THE TEETH.

When describing the horns of cattle (p. 148,) we spoke of the



BIRTH.

SECOND WEEK.

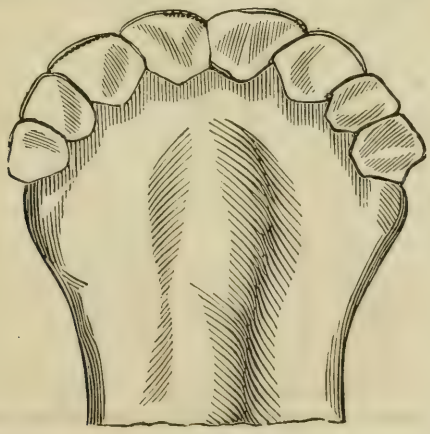
ususal and incorrect method of estimating their age by the horns. Far surer marks are presented in the teeth.

THIRD WEEK.

The mouth of the new-born calf presents an uncertain appearance, depending on the mother having exceeded or fallen short of the average period of gestation. Sometimes there will be no teeth appearing, but generally, either two central incisors will be protruding through the gums, or they will have arisen and attained considerable bulk.

About the middle or close of the second week, a tooth will be added on either side, making four incisors.

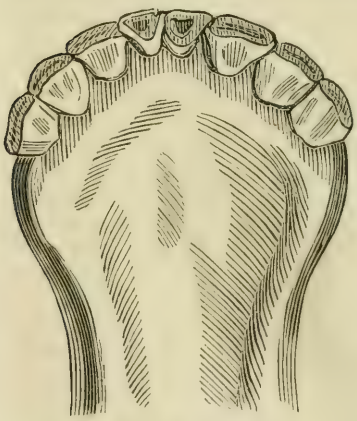
At the expiration of the third week, the animal will have six temporary incisors or front teeth.



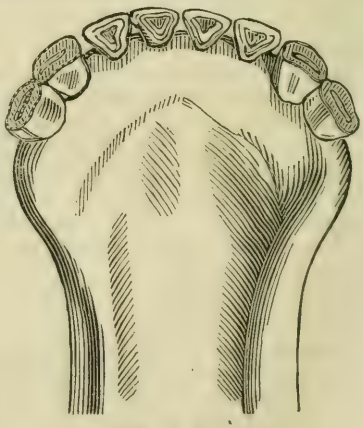
MONTH.

At a month, the full number of the incisors will have appeared. These are the temporary or milk teeth. The enamel covers the whole crown of the tooth, but not entering into its composition, and the edge is exceedingly sharp. The only indication of increasing age will be the wearing down of these sharp edges, and the appearance of the bony substance of the tooth beneath. The two corner teeth will be scarcely up before the centre teeth will be a little worn. At two months, the edge of the four central teeth will be evidently worn; yet as the wearing is not across the top of the tooth, but a very little out of the line of its inner surface, the edge will remain nearly or quite as sharp as before. At three months, the six central teeth, and at four months the whole set, will be worn, and the central ones most of all; but after the second or third month, *the edge* of the tooth will begin to wear down, and there will be more of a flat surface, with a broad line in the centre.

About this time a new change will begin, but very slowly. The central teeth will not only be worn down on their edges, but the whole of the tooth will diminish, and a kind of absorption will commence. There will be little, but increasing space between them. The face of the tooth will likewise be altered; the inner edge will be worn down more than the outer, and the mark will change from the appearance of a broad line to a triangular shape. The commencement of this alternation of form and diminution of size may be about the fourth month, and our cut gives a representation of the two central incisors at eight months. The central teeth are now not above half the size of the next pair, and those are evidently lessened.



EIGHT MONTHS.

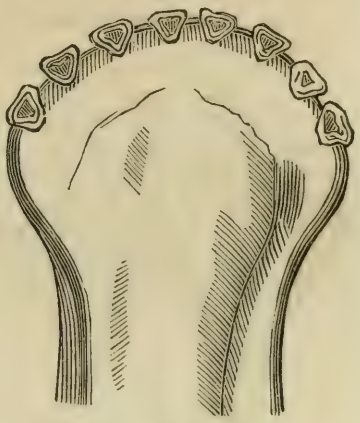


ELEVEN MONTHS.

At eleven months, the process of diminution will have extended

to the four central teeth, in the manner represented in the cut. The spaces between them will now be evident enough.

FIFTEEN MONTHS.



EIGHTEEN MONTHS.

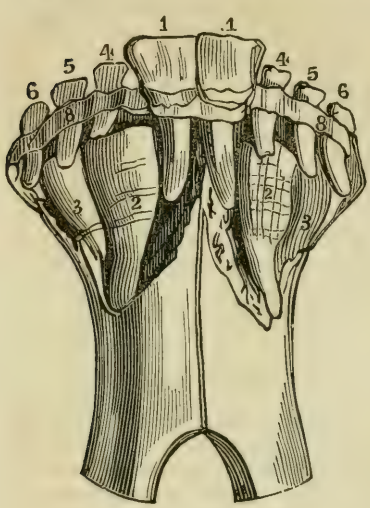
The last cut gives the curious and diminutive appearance of all the incisors at eighteen months old. It would appear difficult to obtain sufficient food to support good condition. It is somewhat so, and it may be in a great measure owing to these changes in the teeth, and the difficulty of grazing, that young beasts are subject to so many disorders from seven or eight months and upwards, and are so often out of condition.

At eighteen months old, the corner teeth will not be more than half their natural size; the centre ones yet more diminished; and the spaces between them almost equal to the width of the teeth. The faces of the teeth will be lengthened; the triangular mark will diminish, principally in the central teeth; while another more or less deeply shaded, will begin to appear around the original mark.

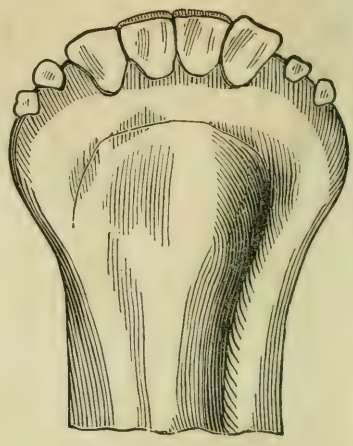
All this while the second set of teeth, the permanent ones, have been growing in their sockets, and approaching towards their gums; The process of absorption commences in the whole milk tooth, and as much in the crown or body of it as at its root. The process of diminution now is confined to the central teeth, and they gradually waste away until they are no longer than crow-quills. About the expiration of the second year, or a little before, the two contral milk teeth are pushed out or give way, and the two central permanent teeth appear.

This cut gives the mouth of a two year old beast, the two permanent central incisors are coming up, and the other six milk teeth remain. The bone in front of the lower jaw is taken away, in order

that the alveoli, or cells for the teeth, may be exposed. The second pair of incisors have almost attained their proper size, but not their proper form. The third pair are getting ready, but the jaw is not yet sufficiently widened for the development of the fourth pair.



TWO YEARS.



THREE YEARS.

The process of absorption will still be suspended with regard to the two outside pairs of milk teeth, but will be rapid with regard to the second pair, and a little before the commencement of the third year they will disappear. This cut represents the three year old beast, with four permanent incisors and four milk teeth.

Now the remaining milk teeth will diminish very fast, but show no disposition to give way, and at four years old there will be six permanent incisors, and often apparently no milk teeth; but if the mouth is examined, the tooth that should have disappeared, and the tooth that is to remain until the next year, are huddled together and concealed behind the new permanent tooth. They are often a source of annoyance to the animal; and the tooth whose turn it was to go must be drawn. The four year old mouth then, as represented in this cut, should contain six permanent incisors and two milk teeth.

At the commencement of the fifth year, the eight permanent incisors will be up; but the corner ones will be small. This cut gives a five year old mouth, or perhaps one a month or two after five years; so that the beast cannot be said to be *full-mouthed*, i. e.,

all the incisors fully up, until it is six years old. It will be seen, however, in this mouth of five years, that the two central pairs are beginning to be worn down at the edges, and that in a flat direction, or somewhat inclining towards the inside.

FOUR YEARS.

FIVE YEARS.

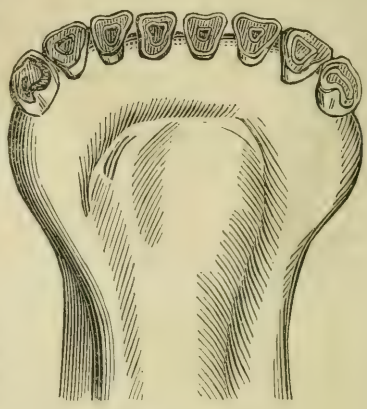
At six years old, the teeth are all fully grown, but this mark has extended over the whole set, and all the teeth are a little flattened at the top; while on the two centre ones there begins to be a distinct darker line in the middle, bounded by a line of harder bone.

From this time the age for a year or two can only be guessed at, and a great deal will depend upon the manner in which the animal is fed. The beast most out, and compelled most to use his incisor teeth, will have them worn farthest down. As a general rule, but admitting of many exceptions, at seven years old, this line is becoming broadest and more irregular in all of the teeth; and a second and broader, and more circular mark appears within the centre of the former one, the most distinct in the central, or two central pairs —and which at eight years has spread over the six central incisors.

SIX YEARS.

At eight years a change takes place which cannot be mistaken. The process of absorption has again commenced in the central incisors; it is slow in progress, and is never carried to the extent seen in the milk teeth, but is sufficiently plain, and the two central teeth are evidently smaller than their neighbors. A considerable change has also taken place on the surface of the teeth; the two dark marks are rubbed into one in all but the corner teeth.

At ten, the four central incisors are diminished in size, and the mark is becoming smaller and fainter. The cut represents the mouth at this age.



TEN YEARS.

At eleven, the six central ones are smaller; and at twelve, all of them are very considerably diminished; but not to the same extent as in the young beast. The mark is now nearly obliterated, except in the corner teeth, and the inside edge is worn down to the gum.

The beast is now getting old; the teeth continue to diminish, and the animal, after fourteen or sixteen years old, is often not able to maintain full condition. He must then be partly fed, yet there are many instances in which favorite bulls last more than twenty years, and cows of the same age who pasture with the rest of the dairy, and give a fair quantity of milk. Some writers have asserted that a good cow will continue good until that age; but both in quantity and quality of milk, as a general rule, a good cow will not continue to breed and give milk until twenty years old.

This method of judging of the age of cattle by the teeth is more satisfactory than by the horns, and little imposition can be practised, whether the animal be young or old. From six to nine we can only guess at the age; but we can form a shrewd guess, and can scarcely be out more than a few months.

In the horn we are subject to imposition; we are obliged to ask questions as to the first calf; and, when the animal gets old, the rings often present a confusion of which the best judges can make nothing.

The grinders will rarely be examined to ascertain the age of a beast. They are too difficult to be got at; and the same dependence cannot be placed upon them. The calf is generally born with two molar teeth; sometimes with three in each jaw, above and be-

low. The fourth appears about the expiration of the eighth month, and the fifth at the end of the year, about which time the first molar is shed. The second is displaced at the end of the second year, and so with the rest, at intervals of a year; but the sixth molar, which is from the beginning a permanent tooth, does not appear until the sixth year.

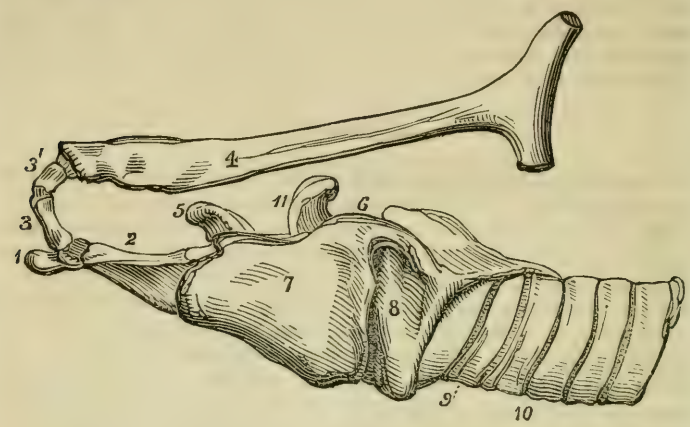
THE TONGUE.

The tongue occupies the base of the mouth. It is firmly held by muscles principally attached to the os hyoides, a singular bone common to it and the larynx. The tongue is composed of the union of these muscles, which extend their fibres through every part of it, and with which is intermingled a considerable quantity of fatty matter. It is covered by the membrane of the mouth, but curiously modified; it resembles more the cuticle or scarf-skin, but the internal layer is fibrous and sensitive, and between the two is a soft, reticulated substance, which serves as a bed for the papillæ, or little eminences scattered all over the tongue, some of which, at least, are supposed to be the terminations of the gustatory nerve, or that branch of the fifth pair of nerves on which the sense of taste depends. The use of the tongue, generally, is to dispose of the food between the grinders during mastication; to collect it afterwards, and, by the assistance of the bars, form it into a pellet for swallowing; it is also the main instrument in drinking. The outer covering of the tongue of the ox is hard and rough. The peculiar way in which the food is gathered renders this necessary; it helps to collect the grass together and form it into a roll before it is brought between the pad of the upper jaw and the incisor teeth of the lower one; it serves to clean the muzzle from annoyances to which it is exposed by means of dirt or insects; and it likewise wipes from the nostril the filth that is discharged from it in various diseases of the membrane of the nose or the air passages, to which the ox is so subject.

The reader will remark the spur projecting from the centre of the body of this bone, *fig.* 1. In some animals it is from two to three inches in extent, and penetrates deeply into the root and body of the tongue; and from its sides, roughened for the purpose, there spring, through the whole extent of the bone, powerful muscles (the *genio-hyo-glossi* muscles, belonging to the chin, the hyoid bone, and the tongue), whose object is to draw down the tongue within the mouth, and limit its action.

There is nothing about the ox which requires confinement of the tongue; but, on the contrary, he has need of one possessing an extraordinary freedom of motion, and the os hyoides is small. Its spur (I. p. 196) is a mere tubercle. There is no penetration or confinement of the root of the tongue. The muscles springing from it

are diminutive and weak, and have little or no power over the body of the tongue.



HYOID BONE, OR OS HYOIDES.

1. The spur.
2. The basis, or greater cornu or horn.
3. The inferior lateral cornu.
3'. The middle cornu.
4. The superior lateral cornu.
5. The epiglottis.
6. The arytænöid cartilage.
7. The thyröid cartilage.
8. The cricöid cartilage.
9. Rings of the trachea.
10. The interposed ligamentous substance between the rings.
11. The Rimæ glottidis, or entrance into the windpipe.

In the hyoid bone of the ox, the muscle (the *hyo-glossus-longus*, the long muscle belonging to the hyoid bone and the tongue) has its origin in an attachment to the corner near the spur; but there are two joints to give greater freedom of motion, and not only so, but the bifurcation of the superior lateral cornu, swelled out into a head or tubercle, has no unyielding cartilaginous attachment to the temporal bone, and is fitted into a curious socket, formed between the mastoid process of the temporal bone, and a plate of bone let down on purpose, and in which it plays loosely, yet securely.

GLOSS-ANTHRAX, BLAIN, OR BLACK TONGUE.

There is a disease of the tongue in cattle, which, from its sudden attack, fearful progress, and frequently fatal termination, requires particular notice. The animal is dull, refuses food, and rumination ceases. A discharge of saliva appears from the mouth; it is at first limpid and inoffensive, but it soon becomes purulent, bloody, and exceedingly fetid; the head and the neck begin to swell; they become enormously enlarged; the respiratory passages are obstructed; the animal breathes with the greatest difficulty, and is, in some

cases, literally suffocated. This is the BLAIN, or GLOSS-ANTHRAX—inflammation of the tongue, or black tongue.

On examination, the tongue is apparently enlarged, but is, in fact, only elevated from its bed between the maxillary bones; and the cause being examined, large vesicles or bladders, red, livid, or purple, are found running along the side and base of the tongue, and particularly towards its anterior part. These bladders are strangely rapid in their growth; become of a great size size; quickly break; and form deep ulcerations. Others immediately arise in their immediate neighborhood, of similar character, but of still larger size. Sometimes the animal dies in twenty-four hours from the first attack; but at other times fever rapidly succeeds, of a typhoid or malignant kind. In a few cases these bladders have been found on the upper part of the tongue, and even nearer to the top of it than to the frænum. The tongue soon becomes really enlarged, and particularly when the lateral or inferior parts of it are the seats of disease. General inflammation of it speedily follows, and that part of it on which the ulcers first appeared, becomes mortified, and may be cut into, or cut away, without the animal expressing the least degree of pain. Incisions into the tongue are not followed by blood, but they bring to view tissues decomposed at some points, and black at others, and bearing the marks of incipient gangrene.

The primary seat of the disease is the membrane of the mouth beneath or above the tongue. Dissection has proved the membrane at the base of the mouth to be the part primarily concerned.

Examination shows intense inflammation, or even gangrene of the part, and also inflammation and gangrene of the œsophagus, the paunch, and the fourth stomach. The food in the paunch has almost offensive smell; that in the manyplus is hard and dry. Inflammation reaches to the small intestines, which are highly inflamed, with red and black patches in the cœcum, colon, and rectum. We cannot speak with confidence as to the cause of this disease: indeed, it is, in a great majority of cases, unknown. We have seen it at all seasons, and under all circumstances,—in stall-fed cows, whether newly bought, or those used to their situation and in pasture. When it becomes epidemic—when many cases occur about the same time, and over a considerable extent of country, and in town dairies as well as country ones, it is usually in the spring or autumn. Most epidemics of an inflammatory character occur at those periods, for the process of moulting is then going forward, and the animals are, to a certain degree, debilitated, and disposed to inflammatory complaints; and these assume a low and typhoid, and then a malignant, form, much oftener and much more speedily in cattle than in other domesticated animals. There appears to be a deficiency of courage and nervous energy in cattle, compared with the horse, and a consequent inability to contend with disease. This affords a key to the progress

and treatment of many of the maladies to which these animals are subject. These epidemics, although dependent on, and produced by, some atmospheric agency, required a predisposition in the animal to be afflicted by the disease.

While the blain sometimes assumes an epidemic character, there can be no doubt of its being *contagious*, and especially under the malignant form. The disease is not communicated by the breath; but there must be actual contact. The beast must eat from the same manger, or drink from the same trough, or be in such a situation that the saliva, in which the virus seems to reside, shall be received on some abraded or mucous surface. The malady is readily communicated when animals graze in the same pasture. The farmer should be aware of this, and should adopt every necessary precaution. This is one of the maladies which may be communicated from the brute to the human subject. The danger, however, so far as it can be ascertained, is trifling, and easily avoided; and a man may attend on a hundred of these animals without injury: *he has to take care that the saliva or discharge from the mouth does not touch any sore place, or lodge upon the lips;* and if he should fear that it may have come into contact with any little wound or sore, he has only to apply lunar caustic over the part, and there will be an end of the matter.

The treatment of blain is very simple; and, if adopted in an early period of the disease, effectual in a great majority of cases. Blain is, at first, a local malady, and the first and most important means to be adopted will be of a local character. It is inflammation of the membrane of the mouth, along the side of and under the tongue, and characterized by the appearance of vesicles or bladders; perhaps pellucid at first, but becoming red or livid, as the disease advances; *These vesicles must be freely lanced from end to end.* There will not be much immediate discharge; the bladder was distended by a substance imperfectly organized, or of such a glairy or thick nature as not readily to escape. If this operation be performed when the saliva first begins to run from the mouth, and before there is any unpleasant smell or gangrenous appearance, it will usually effect a perfect cure. If the mouth be examined four-and-twenty hours afterward, the only vestige of the disease will be an incision, not looking very healthy at first, but that will soon become so and heal.

If the disease has made considerable progress, and the vesicles begin to have a livid appearance, or perhaps some of them have broken, and the smell is becoming very offensive, the mouth must be carefully examined, and any bladders still remaining whole, or new ones beginning to rise, must be deeply and effectually lanced, and the ulcers washed half-a-dozen times in the day, or oftener, with a diluted solution of the chloride of lime (a drachm of the powder to a pint of water.) By means of a syringe or piece of sponge, this may be brought into contact with every part of the ulcerated surface

In a very short time the unpleasant smell will diminish or cease, and the ulcers will begin to assume a more healthy character. When all fetor is removed, the mouth should be bathed with a lotion composed of equal parts of tincture of myrrh and water, or a pretty strong solution of alum, and a fourth part of the tincture of catechu.

This treatment will be usually successful if the ulceration has not assumed too much of the gangrenous character, and if symptomatic or low fever has not appeared in too intense a degree. These are very important circumstances, and should not be passed lightly over, for several of the most fatal diseases are of comparatively little importance, and easily got rid of in the early stage, and neglect produces all the danger. The blain, although easily cured when attacked in its early state, becomes uniformly fatal if neglected. In these early stages of the blain, the disease should not be always so simply treated, and the mere lancing of the vesicles the only means adopted; but it should be the first thing done, and that on which there is the greatest dependence, as attacking the fountain-head of all the after mischief, and getting rid of the danger of suffocation at least.

The blain, suffered to take its course, speedily becomes connected with fever, and that fever is not long in taking on a typhoid form; even then we should certainly extract blood. Four, or five, or six quarts should be taken away, according to the size of the beast, and the urgency of the case; or rather we would bleed until we begin to perceive its effect on the general circulation.

In addition to this, as constipation usually accompanies the commencement of fever, and is never absent in cases of blain, we should administer a purgative—from a pound to a pound and a half of Epsom salts; and likewise throw up some laxative injections.

Let Epsom or Glauber salts, or the common culinary salt, be dissolved in simple water or thin gruel. They want nothing to insure or increase their effect.

The practitioner may not be called in until gangrenous ulcers fill the mouth, and the membrane of the mouth, and the tongue itself, seem to be sloughing away in pieces; ulcers, perhaps, have also begun to appear externally behind or under the jaw; and, most of all to be dreaded, and frequently accompanying the worst stages of blain, ulcers begin to break out about the feet, and particularly at the junction of the hair and the hoof, and threaten the loss of the hoof.

Chloride of lime must be used from morning to night, until the gangrenous character of the ulcers is changed, and then the tincture of aloes, or the tincture of myrrh substituted. Ulcers in any other part, particularly about the feet, must undergo a similar treatment. Chloride of lime, the solution being by degrees strength-

ened, will remove the fetor, and usually give the ulcer a healthy surface.

No bleeding will be required here: the stage of acute fever is passed. Physic should be given—one dose at least, whatever is the state of the bowels, and even although the diarrhœa of typhoid fever should be established; but, at the same time, the system must be roused and supported. A double dose of aromatic powder should accompany the physic; and, after that, the gentian, calumbo, and ginger roots should be regularly administered in powder, suspended in gruel. Two drachms of gentian and calumbo, and one of ginger, will constitute an average dose, and may be repeated morning and night.

The practitioner should pay considerable attention to the food. It is not always that the appetite fails in this disease; nay, may remain unimpaired to the last; but the soreness of the mouth has prevented the animal from eating or ruminating. He should be fed with gruel—some of it always within his reach, and he will sip no inconsiderable quantity of it. More should be poured down, or given by the stomach-pump—the latter being the better way of administering it. When poured down bodily, it will generally find its way into the rumen, and there be retained, and in a manner lost; but when given from the small pipe of the pump, and not too strongly forced on, it will trickle down the gullet, and be likely to flow on into the fourth, or true digesting stomach, and be converted into immediate nutriment.

This is one of the numerous class of diseases, under which the animal either cannot labor a second time, or to which the constitution betrays an evident insusceptibility for a considerable period. Cattle recovered from the blain have been purposely subjected to contagion, without effect.

Homœopathic treatment.—The first thing to be done is to scrape the pustules with a curved knife, an iron spoon, or a wisp of straw, after which the part is to be well cleaned by means of a cloth steeped in oil. Once the pustules have been removed, the tongue should be touched every day with a cloth steeped in water, to which some drops of *arsenicum* have been added. This plan will suffice in most cases. If symptoms of the disease still remain, for instance, a fetid state of the breath, &c., *acidum phosphoricum*, alternately with *mercurius solubus*, daily.

THRUSH IN THE MOUTH.

There is a disease, sometimes epidemic, especially in the spring and winter, when the weather is unusually cold and wet, that may be mistaken, and has been so, for blain. It consists in the appearance of pustules, or sometimes vesicles, not merely along the side and at the root of the tongue, but all over the mouth, and occa-

sionally even on the outside of the lips. These pustules break, and minute ulcers succeed, which may run a little into each other; but they oftener speedily heal.

This is very harmless. There is sometimes a slight degree of fever, rarely such as interferes with the appetite, but never to indicate danger. The disease may last ten days, a fortnight, or more; but gradually yields to mild doses of physic; the beast may thrive the better afterwards for having got rid of something that was oppressive to the constitution.

Homœopathic treatment.—This requires more especially the employment of *aconitum*, and of *mercurius vivus*. *Acidum nitri* also is very effectual, especially in dry inflammation. *Carbo vegetabilis* is specific in treating induration succeeding to inflammation: *conium*, *lycopodium* and *silicea*, are also recommended in this case.

THE SALIVARY GLANDS.

The food, when first gathered, is rolled hastily into a pellet, and swallowed, without being mingled with much of the moisture of the mouth; but the second mastication is another affair—the food is not only to be thoroughly broken to pieces and ground down, but brought into that softened and pultaceous state, in which it can be thoroughly acted upon by the gastric juice, and digestion performed. The mouth is furnished with various glands, which secrete a limpid fluid of a somewhat saline taste, and called the saliva, by which the food is thus softened. These are differently named, according to their situation.

The PAROTID GLAND, or the gland in the neighborhood of the ear, is the largest and most important of them. It occupies the hollow which extends from the root of the ear to the angle of the lower jaw. It consists of a vast number of little glands connected by cellular tissue, each having its minute duct to convey away the fluid that is secreted, and these ducts communicating with one another, and joining together to form one main branch, termed the parotid duct, through which the united stream is conveyed into the mouth.

The following cut will give the reader a sufficient notion of the situation and connections of this gland, and also of the bloodvessels of the neck, and principal muscles of the upper part of it.

1. The *splenius* (spleen-shaped) muscle, occupying almost the whole of the upper and side part of the neck, and extending from the parietal ridge, as far down as the fourth and fifth vertebræ of the back. It arises by two tendons, one from the atlas, and the other from the mastoid process of the temporal bone: it is attached superiorly by tendinous and fleshy fibres to the ligament of the neck, and inferiorly by fleshy fibres to the transverse processes of the bones of the neck, and the fore part of the spine. There is one muscle on each side of the neck. When they act together, they erect

and support the head and neck; when either acts alone, it inclines the head and neck on that side. It is the muscle on which, with the *trapezius* in the next cut, the form of the upper part of the neck principally depends.

2. The *inferior oblique* (taking an oblique direction). A deeper-seated muscle on each side of the neck, from the first to the second bones of the neck.

3. The *superior oblique*. Likewise a deeper-seated muscle, from the first bone of the neck to the portion of the parietal bone which forms the poll. Both acting together, they elevate the head;—either acting alone, turns it on that side. When the hand is passed down the side of the cervical ligament, even near to the poll, the muscles of the neck will be observed to become rapidly thicker. The thickness of the neck of the ox lies principally below; so it is in almost all ruminants, and particularly in the deer tribe; therefore these muscles are large.

4. A portion of the *levator humeri* (the elevator of the arm), reversed. It arises by an aponeurotic expansion from the parietal ridge, and by a strong tendon, from the mastoid process of the temporal bone, and from the four first bones of the neck, and, connecting itself with the ligament of the neck, it goes to the muscles of the shoulders and the upper bone of the arm. When the head is made a fixed point, one of them, acting alone, draws forward the shoulder and arm; when the shoulder is made the fixed point, it

turns the head and neck; or, the shoulder still being the fixed point, and both acting, the head is depressed. This muscle is large in the ox. It is united with the *rhomboideus longus* (the long rhomboid-shaped muscle), and evidently contributes materially to the formation of those sub-cutaneous muscular fibres, which are substituted for the proper sub-cutaneous muscle of the neck. Inferiorly it is divided into three branches—the one, thin and inferior, goes to the anterior extremity of the sternum; the second, at the inferior part of the arm, furnishes a tendon, which is inserted with that of the *pectoralis transversus* (the transverse muscle of the chest) into the humerus; while the superior division gives a strong tendinous expansion, which spreads over, and loses itself upon the outer face of the humerus.

5. The *sub-scapulo-hyoidus*, (belonging to the substance underneath the shoulder, and to the hyoid bone,) from the shoulder-blade to the body of the hyoid bone, to draw backward that bone.

6. The *sterno-maxillaris*, (belonging to the sternum and the lower jaw,) from the cartilage in front of the chest to the angle of the lower jaw. It is attached to the lower jaw by means of a bifurcated tendon. The posterior branch is inserted into the masseter muscle, on which it acts as a kind of bridle in the usual process of mastication, and more particularly as tending to limit the lateral and grinding motion of that muscle. The other goes on and attaches itself to the buccinator muscle, immediately to be described. Thus they act quite as much as muscles of mastication, as they are concerned in the bending of the head, and perhaps more so. The whole muscle may act on the head—the separate portions of it on the function of mastication.

7. The *sterno-hyoidus*, from the sternum to the hyoid bone, and to the thyroid cartilage of the larynx, in order to draw the bone and the cartilage downward and backward.

8. The *masseter*, (masticating muscle) covers the greater part of the side of the superior maxillary bone, and is inserted into the roughened surface of the angle of the lower jaw bone.

9. The *buccinator* (the muscle by which the human being blows the trumpet) extends from the alveolar borders of the upper and under grinders, over the cheeks, and the membrane of the mouth, and to the angle of the mouth. It tightens the membrane of the mouth, and thus principally assists in the disposal of the food in the mouth, and also in retracting the angle of the mouth.

10. A branch of the *os hyoides*.

11. The *stylo-maxillaris*, from the styloid process of the occipital bone to the angle of the lower jaw, to draw it backward, and to open it.

12. That portion of the stylo-maxillaris, which is called the *digastric*, is seen here.

13. The little flat muscle, the *stylo-hyoideus*, is here represented;

extending from the styloid process of the occipital, to the angle of the corner of the hyoid bone, and its action confined to the retracting and elevating of the corner of that bone.

14. A muscle of the larynx.

15. The *parotid gland*, (the gland in the neighborhood of the ear,) the greater part of it reversed, to show the parts beneath.

16. The *parotid duct*, winding within the angle of the jaw, and escaping again at a very little distance, and in company with the maxillary vein and artery climbing up the cheek, and perforating the buccinator muscle, in order to discharge its contents into the mouth. The orifice is generally found about the third or fourth grinder. The situation of the duct should be carefully observed, for obstruction and fistula of this duct is frequent in the ox, and operations of various kinds may be necessary.

17. The *submaxillary gland* (the gland under the jaw). Its commencement is almost as high as that of the parotid, but behind it; thence it reaches down to the angle of the jaw, and there begins to take a direction forward between the branches of the lower jaw, and terminates in a duct which opens on either side of the frænum of the tongue.

18. *Lymphatic glands* (glands containing lymph) of the neck.

19. *Lymphatic glands* found between the branches of the lower jaw; neither belonging to the submaxillary nor sublingual glands, but often confounded with them. They become inflamed and enlarged in almost every case of catarrh. These glands often enlarge to a very considerable degree, suppurate, and troublesome ulcers ensue.

20. The *jugular* vein (the vein of the throat), previous to its bifurcation, and pointing out the usual situation for bleeding.

21. The *submaxillary vein*, returning the blood from the tongue, the mouth, and the face generally. It is scarcely lost at all within the angle of the lower jaw, but runs along the edge of it, and might be opened with advantage in some affections of the face. When it emerges from the jaw, and begins to climb up the face, it is found between the parotid duct and the submaxillary artery.

22. The larger branch of the *jugular* above the bifurcation receiving the blood from the upper part of the face and neck, and also from the brain. It is so near to the parotid gland, that it would be difficult to bleed from it there. The bifurcation is sometimes completely covered by the parotid gland. We must therefore be always content with bleeding below the division of the jugular in cattle.

23. The *temporal* vein (the vein of the temple).

24. The trunk of the *parotidean* and *auricular* veins (the veins of the parotid gland and of the ear).

25. The *internal jugular*, and particularly its passage below the subscapulo-hyoideus muscle. The path of the internal jugular by the side of the carotid, under that muscle, is marked by a dotted line.

26. The *carotid ratery*, where it emerges from below the subscapulo-hyoideus muscle. Its path under that muscle, by the side of the internal jugular, is also marked by a dotted line, showing the connection of the two vessels. The figures are placed at the spot where it would be most convenient to operate, if circumstances should require that a ligature should be passed round the carotid.

27. The *submaxillary artery* given off from the main trunk, and pursuing its course anteriorly, to bury itself beneath the angle of the lower jaw. It is afterwards seen emerging from under that bone in company with the sub-maxillary vein, and the parotid duct, and being the lowest of the three.

28. The *temporal artery*, at which the pulse may often be conveniently examined.

29. One of the arteries supplying the parotid gland.

30. The *eighth pair of nerves*, or the motor organic nerves.

31. One of the *linguales*, or nerves by means of which the tongue is moved.

INFLAMMATION OF THE PAROTID GLAND.

The parotid gland, in cattle, is very subject to inflammation. Contusions or wounds of the part are frequent causes of inflammation; and this gland, in the ox, sympathizes strongly with catarrhal affections of the upper air-passages. A bullock will rarely have hoose, accompanied by any degree of fever, without some enlargement and tenderness of the parotid. There is scarcely an epidemic among cattle, one of the earliest symptoms of which is not swelling of the head and neck. These swellings under the ear are guides on which we place much, and perhaps the greatest, dependence, in judging of the intensity and danger of the disease; and particularly, and most of all to be dreaded, its tendency to assume a typhoid form. These enlargements have been confounded with strangles, but through want of proper examination of the parts.

Inflammation of the parotid gland is accompanied by heat and tenderness of the part, and which render the beast unwilling to eat, or to ruminate; and sometimes by so much swelling as to threaten immediate suffocation. This is one of the varieties of swelling about the head of cattle characterized by the expressive term of *strangullion*.

The swelling of the parotid gland extends oftener and more rapidly downward than upward, reaching the throat, and pressing upon all the neighboring vessels. When there is much swelling, suppuration and abscess are at hand, and should be encouraged by fomentation; and as soon as any motion of pus can be detected, the tumor should be freely lanced; the fluid will readily escape, and the abscess fill up: but if the swelling be suffered to burst, ulcers will be formed, exceedingly difficult to heal, and that will too often run on to gangrene. It is a singular thing that while the flesh of the ox is

one of the supports of human life, and no food contributes more or healthier nutriment, there is no animal in which grangrenous ulcers are so frequently formed, or in which they are so corroding and malignant. From inflammation, apparently of only an inconsiderable portion of the parotid gland, we have known ulcers of the most offensive character extend from ear to ear, and expose the most important vessels of the upper part of the neck.

This inflammation is to be combated by fermentations, cataplasms, and, occasionally, blisters, in the early stage; bleeding and physicking must be resorted to, according to the degree of general fever; and after the ulcer has formed, the chloride of lime must be used to arrest the progress of gangrene, and the tincture of aloes to heal the part after the bursting of the abscess. Mild purgatives will be very useful, each of them containing aromatic or tonic medicine.

Obstruction to the passage of the saliva will sometimes occur in the duct; swelling will ensue at the place of obstruction; and, at length, the fluid continuing to accumulate, will burst the vessel, and a fistulous ulcer will be the result.

THE SUBMAXILLARY GLANDS.

The second source of the saliva is from the *submaxillary glands*. The bulk of the maxillary gland is seen at fig. 17 (p. 202,) even posterior to the parotid gland. The direction within the branches of the jaw is also plainly traced; and there is a continuation of glandular substance, or a collection of little glands extending on either side within the branches of the jaws, the common duct from all of which pierces through the substance at the root of the tongue, and opens on either side of the frænum.

The termination of the duct is particularly evident in cattle, and is very curiously constructed; a cartilaginous plate doubles upon itself, and serves as a covering, or roof, to the little teat-like orifice of the duct.

BARBS OR PAPS.

Occasionally in catarrh, and oftener when the membrane of the mouth generally is somewhat inflamed, and the pustules of which we have spoken appear in various parts, these little projections likewise become red and enlarged, and the beast is said to have the BARBS OR PAPS. To burn or cut them away, converts temporary inflammation into serious and even gangrenous ulcers. A dose of physic, and, if necessary, a moderate bleeding, will usually cause the barbs to disappear, or, if a little disposition to ulceration should appear, an alum wash will be all that is needed.

In cases of deep abscess, which sometimes appear under the tongue, from inflammation, or, much oftener, from improper treatment, the chloride of lime will be the first and chief application. It must be injected to the very bottom of the sinuses, and continued to

be used, several times in the day, while any unpleasant smell is perceived. To this will succeed the alum-wash, or an infusion of catechu.

THE SUBLINGUAL GLANDS.

The third source of the saliva is from numerous glands scattered over the membrane of the mouth generally, but principally collected at its base and under the tongue, and therefore called the *sublingual* glands. They consist of small collections of glands, with minute openings into the mouth, but which also a little enlarge, when there is tendency to inflammation in the mouth. No harm can ever come of these GIGS and BLADDERS, if let alone. On every part of the cheeks and lips these little glands are found; and the quantity of saliva obtained from all of these, especially when they are excited to action in mastication or rumination, is very great.

THE VELUM PALATI, OR SOFT PALATE.

Advancing to the back part of the mouth, we find a curtain dividing it from the pharynx, or cavity immediately above the gullet. It is formed of a continuation of the membrane of the mouth anteriorly, of that of the nose posteriorly, and it hangs from the crescent-formed border of the palatine bone, p. 144. It reaches from the palate almost to the entrance into the gullet and the windpipe. The food is returned to the mouth in the natural process of rumination, and also in vomiting, which occurs very rarely indeed, or, at least, regurgitation from the rumen, for we much doubt whether true vomiting, or the return of food from the fourth stomach, was ever seen in cattle.

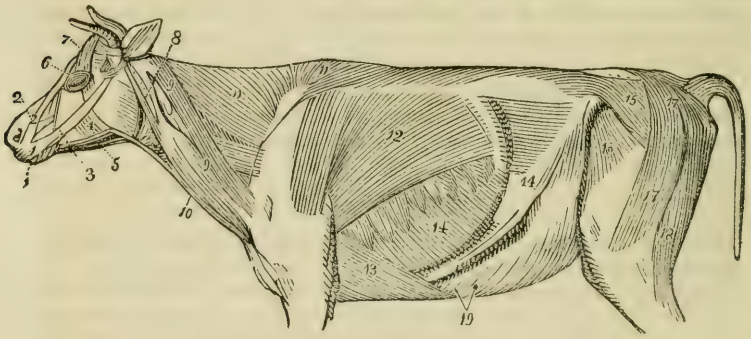
THE PHARYNX.

The food having passed beneath this soft palate, reaches a funnel-shaped cavity between the mouth and the gullet and windpipe. It is lined by a membrane full of little glands, that pour out a viscid fluid, by which the pellet of food is covered and prepared to pass more readily down the gullet. Within this membrane are muscles that contract with considerable force; and the food, almost beyond the action of the tongue, is seized by these muscles and forced along the pharynx to the entrance into the œsophagus or gullet.

CHAPTER XI.

THE ANATOMY AND DISEASES OF THE NECK AND CHEST.

In order to understand the proper conformation of these parts, differing so materially as they do in a kindly feeding and an unprofitable beast, and differing, too, so much in various breeds, each excellent in its way, we must have recourse to two anatomical plates, which include, as much as possible, the whole muscular system of the ox.



1. *Orbicularis oris* (the ring-shaped muscle of the mouth). This muscle is found within the border of the lips, and constituting their principal substance and thickness, forming two semi-ovals, and united together at the angle of the lips. It is large and mixed with tendinous fibres, because the lips are powerfully employed in the ox in grasping and assisting in tearing off the food,

2. The *elevator of the upper lip, and angle of the nose.*

3. The *Zygomaticus* (arising near the yoke-formed arch under which the temporal muscle passes) lies along the middle of the side of the face; it also assists in the motion of the lips, and particularly in retracting the angle of the lips. This is particularly developed in the ox, for it has much to do in the gathering of his food.

4. The *depressor of the lower eyelid*, a sub-cutaneous muscle of considerable development.

5. The *depressor of the lower lip*, lying along the side of the lower jaw, and going to the inferior lateral part of the under lip, and to separate the under lip from the upper.

6. *Obicularis palpebrarum* (the ring-shaped muscle of the lids), employed in keeping the eyes open. When this muscle ceases to act the eye closes, from the elasticity of the cartilage at the edge of the lid.

7. The *levator of the upper eyelids.*

8. The *depressor of the ear.* This is a singular muscle, lying immediately under the skin; running over, and attached to, the parotid gland; and reaching from the outer side of the root of the ear, down to the very larynx. The ears of the ox have an extensive, although slow motion, and have to defend the eyes from insects.

9. The different portions of the *levator humeri*, through the whole of their course: the upper part of this muscle was described at p. 202. On this muscle the form of the lower part of the neck principally depends, and it is much more developed in some breeds than in others. However thin and deer-like we may wish the neck of the ox to be at the setting on of the head, we look for plenty of muscles at the bottom of it, or we shall have neither strength nor substance in any part of the animal.

10. The *sterno-maxillaris*, described at p. 203.

11. The *trapezius* (the quadrilateral muscle). This muscle is united with the *rhomboideus longus*, and forms the exterior muscular layer immediately below the integument, and above the *splenius.* (See p. 202, and also the next cut). On this, and on the splenius beneath, depends the form of the upper part of the neck and withers, and, in some breeds, the cervical portion of it is particularly fine. The combined action of the whole is to raise the scapula, and draw the bone forward.

12. The *latissimus dorsi*, so called from its extent, being the widest muscle of the back, and reaching over the whole of the upper and side part behind the scapula, of which bone it is a muscle, drawing it backward, and elevating its inferior extremity. It is thin; much adipose matter insinuates itself between the fibres, and gives it a false appearance of substance.

13. The *pectoralis major* (the larger pectoral muscle). It is the only pectoral muscle, properly so speaking, for the minor is not found. There are, however, the transverse pectorals, of which we shall give an account presently. From the ensiform cartilage at the termination of the true ribs, and even from the external oblique muscle of the belly, it extends forward, strongly attaching itself to the fourth, fifth, and sixth pieces of the sternum, and also the lesser tubercle of the humerus, and the inner part of the end of the scapula or shoulder-blade. It draws the scapula into an upright position.

14. The *external oblique* muscle of the abdomen. It extends over the whole of the inferior and lateral portions of the belly, giving support to the contents of the belly; assisting in the evacuation of the fæces and urine, and also in that of the fœtus, and being a valuable auxiliary in the process of breathing. Although it has not so much work to perform as an auxiliary muscle in respiration, or in supporting the abdomen and its contents in the shocks to which they are occasionally exposed in rapid motion, yet this and the other oblique muscle have a great deal more constant labor than is generally supposed in supporting the immense weight of the distended paunch, and sometimes powerfully contracting upon it. These oblique muscles, which constitute the flank pieces of various kinds in the carcass, are of considerable thickness, and never overlooked by the butcher when examining a beast.

15. The *glutæus maximus*, or great muscle, belonging to the buttock, principally constitues the anterior, middle, and external parts of the haunch. Its attachments are very complicated, and its action is what its situation at once indicates, either to flex and bring forward the hind limbs upon the loins, or the pelvis and loins upon the hind limbs, accordingly as either is made a fixed point. This muscle is the one which is most largely concerned in propelling animals forward, and is in cattle a large one, though relatively, for no great speed is usually required from them, nor any sudden and powerful flexion of the limbs. This muscle is brought into view in cattle by raising the aponeurotic expansion of the *fascia lata*, and it is concealed superiorly and posteriorly by the prolongation of the *semitendinosus* muscle.

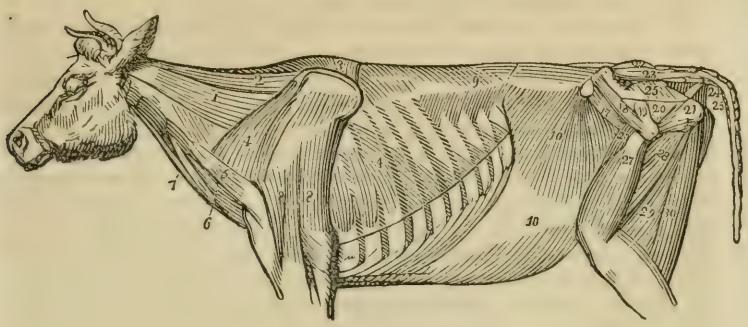
16. *Fascia lata.* This muscle, although we have termed it a *fascia* or envelope, is a fleshy and tendinous expansion over the whole of the anterior and external surface of the thigh, whence it spreads below the stifle. Its chief use is to strengthen the muscles beneath; but, besides this, it assists the extension of the leg on the thigh and the flexion of the thigh on the pelvis. Its fleshy portion is divided into two, and its tendinous expansion extends over all the muscles of the quarters, and unites with the principal flexor muscle of the thigh—the *adductor magnus.* This is a part of the beast where we look for plenty of muscle and fat, and we can hardly find quarters too long and too well developed.

17 and 18. The *biceps femoris*, or two-headed muscle of the thigh. It flexes the leg upon the thigh, and contributes to turn the leg inward. In cattle, it has no spinal prolongation, and it does not ascend beyond the ischial tuberosity.

19. The foramina belonging to the sub-cutaneous abdominal vein.

The preceding numbers refer to the cut, page 202; those following, to the cut on the next page.

1. The *splenius* lying under the trapezius, and already described in p. 201.



2. The anterior portion of the *trapezius*, extending along the edge of the cervical ligament, from the back of the head to within the superior part of the scapula, and raising the scapula and carrying it forward, already alluded to, p. 209.

3. The *rhomboideus longus* (the long diamond-shaped muscle). It has already been stated that this muscle in the ox is united with the *trapezius*, and forms the superior and lateral part of the neck, extending from the head to the withers. It varies materially in different breeds. Nothing can be so unlike as the ridge, or crest of the neck, in the Devon and the Galloway, or even the Devon and the Hereford. In all cattle it is proportionally large, because the neck generally was designed to be fleshy; a fine crest, the neck gradually thickening below, may be considered as a point of beauty in cattle.

4. The *serratus anticus major* (the anterior part of the great saw-shaped muscles, or those by which the shoulder of the animal is attached to the trunk, and the weight of the trunk supported). These muscles of the shoulder are numerous in the ox, and are separated from each other by cellular and adipose matter. The strength of attachment which rapid motion renders necessary, is not wanted, but the accumulation of the flesh and fat goes on wherever it can. The serrated muscles are seen prolonged upon the side behind the shoulder.

5. One of the insertions of the *levator humeri*.

6. A portion of the *serratus* muscle, occupying the posterior and inferior portion of the neck, where the neck emerges from, or enters into the chest. It consists of the union of two or three muscles, particularly one lying across upon the first ribs. It is composed of a long band, larger posteriorly, which takes its origin about the middle

of the fourth rib, and spreads forward over the three anterior ribs, and even to the vertebræ of the withers.

7. Another head of the *levator humeri.*

8. The *triceps extensor brachii,* or three-headed extensor of the arm. Two of the portions are here seen, the one from the external part of the shoulder to the outer tubercle on the bone of the arm, and also on the outer parts of the elbow; and the other occupying the angular space between the shoulder-blade and the bone of the arm; the muscle has its principal lower insertion in the posterior and superior part of the elbow. There is a third portion on the interior of the scapula and the bone of the arm. The action of the compound muscle is evidently to bind the humerus, or bone of the arm, on the shoulder-blade, and thus to extend and throw forward the lower part of the limb. These muscles are small in cattle for these evident reasons, that strength is not required in the ox, as a beast of burden, and his speed never taxed to any extent; and because needless flesh here would be precisely in the part where it is coarsest and least valuable. The diminution of muscle on the external part of the shoulder, and the accumulation of cellular and fatty matter between it and the trunk, being the reverse of what we find in the horse, are apt illustrations of the skill with which every animal is adapted to his destiny.

9. Another portion of the *serrated* muscles, belonging to the back and ribs. These are principally muscles of respiration; they elevate the ribs, and bring them forward, and thus expand the chest, and assist in the process of inspiration. This is a small muscle, because from the idle life of the ox, his breathing is seldom hurried.

10. The *internal oblique* muscle, or inner layer of muscles constituting the walls of the belly. These muscles assist the external ones in supporting the weight of the belly, and compressing its contents. Being placed somewhat farther back than the external oblique, they will offer less assistance in respiration, but contribute more to the expulsion of the urine and fæces.

17. The *iliacus internus,* or inner and larger muscle belonging to the flanks, occupies the upper and inner space between the spine and the thigh. Its use is to bring the thigh under the haunch, which, in the slow-motioned ox, is rarely performed with much rapidity or force, therefore it is not large. It enters into the composition of the *aitch* bone and the upper part of the round.

18, 19, 20. The *glutæi muscles* lie on the upper and outer parts of the haunch, and the good or deficient form of the quarters depends upon them. They are valuable in the ox, as indicating the general muscularity of the system. This may, however, be carried too far. Contributing to the formation of the rump, and, in a certain degree, of the round, they constitute some of the tenderest and most valuable parts of the ox.

21. The *pyriform* (pear-shaped) muscle, found within the cavity of the pelvis, and on the inside of the aitch-bone and the rump. Large and composed of soft fibres, in the ox. Its office is to assist in the extension of the haunch.

22. *Levator caudæ brevis* (the shorter elevator of the tail). It is used in common with other muscles to move the tail.

23. *Levator caudæ longus* (the long elevator of the tail).

24. *Depressor caudæ*, by which the tail is pressed upon the haunch, and that sometimes with a force that would scarcely be thought possible.

25. The *intertransversal muscles*, whose oblique fibres run from the base to the edge of the bones of the tail, through its whole extent, and by which the lateral motions are effected. By the union of all of these muscles the tail is made a most effective instrument in driving away or destroying thousands of winged blood-suckers, by which the animal would otherwise be tormented.

26. The *rectus femoris*, or straight muscle of the thigh, runs along the whole of the anterior portion of the thigh, from the ilium to the patella, or knee-cap. It is a very conspicuous muscle in the round, and helps to extend the thigh and advance the haunch.

27. The *vasti muscles*, so called from their occupying the greater part of the thigh. The three branches are commonly distinct, but they are not much developed, for they have not the work to do. The butcher thinks that there is a great difference between the round of the beast that has worked, and of another that has not; and he is right, for nothing tends so much to the development of the muscular system as regular exercise.

28. The *great adductor*, or bringer forward of the thigh. This muscle occupies the external face of the posterior part of the thigh. It rises as high as the spine of the sacrum, and reaches the anterior portion of the leg by three different branches or heads, and thence is called the *triceps adductor femoris*. It bends the leg upon the thigh; it carries the whole limb backward in the act of kicking, and also assists in elevating the fore part of the body in preparing for a leap. It is large, reaching along the spine, to the very angle of the croup.

29. The *semitendinosus*, so called from its half-tendinous construction, constitutes, with the next muscle, the posterior and internal face of the haunch and thigh. It is a flexor or bender of the leg.

30. *Adductor tibiæ longus* (the long adductor, or bringer forward of the thigh;) sometimes called, from its construction, the *semi-tendinosus* muscle. It is a flexor or bender the leg.

The reader is now prepared to enter with us, so far as we can without being too dryly anatomical, into the consideration of the form and structure of the neck and trunk of cattle; and particularly as connected with the production of milk while living, and beef when dead.

DESCRIPTION OF THE NECK.

The neck of the ox (see cut of skeleton, p. 143,) is composed of seven bones.

In cattle there is great shortness of the neck generally—shortness, and yet magnitude of every bone—the avoidance of smooth surface, and the springing out, above and below, and on one side and the other, of processes which are long, broad, and roughened; and there is not an elastic movement about the whole of this part of the animal, and the neck is level. The intention of nature is plain enough in the construction of the neck of the ox. All these widened, roughened, tuberous bones are for the attachmemt of muscles—the accumulation of flesh. True, these are not the prime parts of the animal, but we see the commencement of the principle. The animal was destined to produce flesh and fat for our nourishment.

A little of the arched form of the neck may be traced in the Devon ox, and is no detriment either to his appearance or his actual value; although common consent seems to have determined that the line from the horns to the withers should scarcely deviate from that of the back. Is this trait of the thorough bred horse, here appearing in cattle, connected with that activity in work for which this breed has ever been unrivaled? The Sussex, and Hereford, and Pembroke, and Welsh, generally, and all the Scots, horned or hornless, have, occasionally at least, this rising of the forehand; and we must be permitted still to retain this form of the neck, as one of the characteristics, and no defect, of the middle-horns, who, in particular districts, and for particular purposes, will still remain and be duly valued, when the triumph of the short-horns is complete in their universal diffusion.

We must go even a little further than this, and claim the rising crest as an essential point in every good bull of every breed. It shall be what, in the majority of cases, it perhaps is, nothing more than an accumulation of fat about the ligament of the neck, and the *splenius* and *complexius* muscles; but it indicates that broad base of muscle beneath—that bulk and strength of neck, so indicative of the true masculine character. We refer to the Devon bull (p. 17), to whom, indeed, it belongs, in virtue of his breed—and we refer, also, to the West Highland bull (p. 42), who has the same claim to it, and also, to the Old Craven bull (p. 82); to the New Leicester bull (p. 88), and even to the short-horned bull (p 109).

The actual bulk of muscle, however, in any part of the ox is not so much greater as the extended and roughened surfaces would lead us to imagine. The head, or the insertion of the muscle, may be spread over the whole surface of the bone; but we have not proceeded far in our examination of that muscle, before we find that its structure, at least in the unworked ox, is not compact muscle. A great deal

more cellular and adipose substance is inserted, not only between the different muscles, but between the little divisions or bundles of which each muscle is composed; and, in fact, between the very fibres of the muscle itself; and that to so great an extent, that in a well-fatted beast it is almost impossible to meet with any simple muscle. The whole is *marbled*—streaks of fat, enclosed in cellular substance, run parallel with almost every fibre. This, at least, is the case with many breeds of cattle, and always is in good cattle.

THE PROPER FORM AND SIZE OF THE NECK.

Some breeds of cattle used to be remarkable for the fineness of the neck at the setting on of the head, and this was considered to be one of their greatest beauties, as well at the surest proof of the purity of their breed: this was long the case with the Devon ox, and when, by chance, this fineness extended to the withers, and was accompanied by a shoulder almost as oblique as that of a thorough-bred horse, the animal was imagined to be perfect. He was a beautiful and a valuable animal, and particularly as this fineness of the neck and withers was usually contrasted in him by a deep breast and an open and wide bosom. That man, nevertheless, deserved the thanks of the Devonshire breeders, who first by selection and breeding a little diminished this fineness of the neck; he did not impair the general beauty of the animal; he did not lessen his activity in the slightest degree; but he increased his size, and his aptitude to fatten too.

In the Ayrshire cow of twenty years ago we had a specimen of the extent to which a clean neck and throat might be carried, without perhaps diminishing at all the milking properties; but materially to the disadvantage of the farmer when her milking days were past. This prejudice in favor of the small neck led the farmers even to prefer their dairy-bulls according to the feminine aspect of their heads and necks. Perhaps the disparity of size which then existed between the northern and southern cattle might somewhat justify them in choosing the smallest variety of the new breed. This, however, having passed over, the Ayrshire breeder, still fond of a neck finely shaped toward the head, has produced one a great deal thicker toward the shoulder and breast; and this not interfering, as experience has now taught him, with the milking qualities of the animal, while it gives aptitude to fatten afterwards.

Mr. Marshall, describing the New Leicester breed, speaks of the *forend* being long, but light to a degree of elegance; the neck thin, the chap clean, and the head fine; the shoulders remarkably fine and thin, as to bone, *but thickly covered with flesh, and not the smallest protuberance of bone discernible.* He also thus speaks of Mr. Fowler's celebrated bull Shakspeare:—His head, chap, and neck were remarkably fine and clean; but his chest was extraordinarily deep, and his brisket down to his knees.

The short-horn, in his state of greatest and most unnatural fatness, has, or ought to have, a tendency to fineness of the neck, at the setting on of the head, however that neck may rapidly increase in bulk, and, in the opinion of some, give too great a weight to the fore-quarters.

The *splenius*, *trapezius*, and *complexus* muscles are those which have most to do with the usual bulk of the superior part of the neck, and with that which it may attain under the process of fattening. The *splenius* may be seen at fig. 1, p. 202; the *trapezius* is depicted at fig. 11, p. 208; and the *rhomboideus longus*, with which the trapezius is united, is brought into view at fig. 3, p. 211. The *complexus major* is situated under them. Some of it rises as low as the transverse processes of the four or five first bones of the back, and from all, except the two higher of the bones of the neck. It therefore has its greatest bulk about the lower part of the neck, and on it, and the fatty matter connected with it, the form and bulk of that portion of the neck depend. Its office is to raise the neck, and elevate and protrude the head. The form of the under part of the neck is much influenced by the *levator humeri*, which is seen at fig. 4, p. 202; fig. 9, p. 208; and, still lower down, by the *pectoral* muscle, for there is but one in the ox, seen at fig. 13, p. 208. Considering, however, the laxity of the muscular fibre in the ox, and the interposition of fatty matter in every part of the muscular system, this muscle can acquire considerable bulk, and is that on which the form and bulk of the neck, at its lower and more important part, principally depend. Whatever may have been said of fine and small necks, the neck must rapidly thicken as it descends, or we shall have a general lightness of carcass, which will render the animal comparatively worthless as a grazing beast.

There are other muscles, however, placed under the *complexus*—viz., the *complexus minor*, and the large and small *recti*, and *oblique* muscles, concerned in the lateral motion of the head, which have considerable size, and contribute materially to the bulk of the neck.

THE ARTERIES OF THE NECK.

Before we leave the neck, we should describe the principal blood-vessels which are brought into view in the cut at p. 202. The *carotid artery* (fig. 26, pp. 202 and 205,) and some of its ramifications, are the only arteries that we could bring into view. The carotid artery on either side proceeds from the heart—escapes from the chest with the windpipe and the gullet; and, approaching the windpipe, and clinging to its posterior surface, climbs the neck, supplying the different parts with blood, until it arrives at the larynx, where it divides into two branches—the external and internal. The external spreads over the face and external part of the head—the

internal enters the skull and is the main source whence the brain derives its arterial blood. Smaller streams are sent to the brain from the vertebral arteries, which, defended and partly concealed in canals formed for them in the bones of the neck, after having fed the neighboring parts, likewise expend the remainder on the brain, entering by the great foramen, through which the spinal chord escapes. A third and smaller branch, leaving the main trunk high up in the neck, sends a small vessel to the brain, under the title of the occipital artery.

We can conceive of very few, if any, cases in which it would be either necessary or advisable to bleed from an artery in the ox. The temporal is, in a manner, out of reach; and the artery of the forehead is so defended by its bony canal, as not to be easily got at; besides which, in bleeding from an artery, there will always be extreme difficulty either in getting the quantity of blood wanted, on account of the contraction of the vessel, or of stopping the hæmorrhage, if the blood flowed freely.

There is one circumstance which will strike every one, and that is —except the larger vessels immediately from the heart—the smallness of the arteries, and the largeness of the veins. What enormous vessels are the jugulars and milk veins! And what a torrent of blood will pour from them if a large incision be made! We shall bear this in mind as we pass on.

The *submaxillary artery* has been already described (fig. 27, pp. 202 and 205,) pursuing its course anteriorily, to bury itself beneath the angle of the lower jaw, whence it speedily emerges again, and close to the angle of the jaw. This should be remembered when we are feeling for the pulse. It occurs under some circumstances of disease, that it is difficult, or impossible, to ascertain the pulse at the jaw, and should, therefore, teach us to go at once to the side when there is any difficulty about the jaw.

The *temporal artery* is much larger, because it has a great surface to ramify upon and to feed: the figure will point out the spot at which the pulse will usually be most conveniently felt.

The *anterior auricular artery* is also large. It supplies not only the anterior muscles of the ear, but also the temporal muscle, deeply lodged in the temporal fossa. The pulse may be very readily felt by means of it, and perhaps more readily than from the temporal.

The *superciliary artery*, escaping from the foramen above the orbit of the eye, is a considerable one. It forms two branches, of which one goes to the root of the horn, and contributes to the vascularity and nutriment of that part. The other descends downward, on the side of the face.

The *occipital artery* is small, the brain of the ox, which a branch of this artery supplies, being small compared to his size.

THE VEINS OF THE NECK.

We here recognize the two jugulars which are found in most animals. The smaller, or *internal jugular* (fig. 25, p. 202,) is deeply seated, and no practical advantage can be taken of it, save the knowledge, that in inflammation and loss of the external vein from bleeding, the return of the blood from that side of the face and head would be facilitated by the internal one, for nature is wonderfully ingenious in making provision for carrying on the circulation.

BLEEDING.

The jugular is the usual place for bleeding cattle. The vessel is easily got at; is large, and can scarcely be missed by the clumsiest operator. The strap round the neck, in order to raise the vein, should be dispensed with. It presses equally on both sides of the neck; and serious consequences are sometimes produced by this sudden stoppage of the return of so much of the blood by the vein. If the vein be pressed upon by the finger, a little below the intended bleeding place, it will become sufficiently prominent to guide any one.

The instrument should be the lancet, but one considerably broad-shouldered. A large vessel will bear a proportionably larger orifice; and the good effect of bleeding depends more on the rapidity with which the blood is abstracted, than on the quantity drawn. The cowherd, or the owner of cattle, would do better to confine himself to the stick and fleam, for the hide of the ox is so thick, and the edge of the lancet is so apt to turn, that it requires a little experience and tact to bleed with certainty and safety.

In the abstraction of blood, and especially at the commencement of a disease, or while inflammation runs high, the rule is to let the blood flow until the pulse plainly indicates that the circulation is affected. All other bleeding is worse than useless—it is sapping the strength of the constitution, and leaving the power of the enemy unimpaired.

Bad necks in cattle, after bleeding, are not common. They must be treated by fomentations and emollient lotions at first, and when these fail, the application of the heated iron to the lips of the wound; or, in very bad cases, the introduction of setons, or the injection of the zinc-wash into the sinus.

BLEEDING PLACES.

If any affection of the mouth, or the nasal passages, should demand local bleeding, cattle may be bled from the *palatine vessels* or veins of the mouth. If the operator cuts but deep enough, plenty of blood will be obtained. The *cephalics* before, and the *saphena*

veins behind, are proper places for bleeding—and some say the *milk*, or *sub-cutaneous abdominal* vein. This last vein is large enough for the speedy abstraction of any quantity of blood in the shortest period; but the jugular is the most convenient bleeding-place in particular cases; and the only question is, whether any local advantage can be obtained by opening the sub-cutaneous abdominal.

THE MILK, OR SUB-CUTANEOUS ABDOMINAL VEIN.

This vein first comes into view under the abdomen, at the commencement of the cartilaginous circle of the false ribs. It emerges from two foramina, or openings, (the situation of which is pointed out by fig. 18, p. 208.) It approaches, on either side, the mesian line of the abdomen, and burying itself between the thighs, it pursues its course towards the inguinal vein. Sometimes it unites with the superpubian vein, and occasionally gives a branch to the sub-pelvian. In the neighborhood of the cartilaginous circle, it presents two branches, the one external and superior, the other internal and inferior. The first springs from various cutaneous ramifications, reaching even to the thorax, and anastomosing or communicating with some of the sub-cutaneous veins of the thorax. The other branch penetrates within the cartilaginous circle, and goes to unite with a principal division of the veins of the sternum.

This milk vein is derived from numerous ramifications from the walls of the chest, as far anteriorly as the breast bone, and taking in some of the external intercostals. It belongs to the respiratory system more than to any other. As it advances posteriorly along the abdomen, it creeps by the side of the udder, or of the scrotum, and empties itself partly into the inguinal, and partly into the sub-pelvian vein. As it travels along the abdomen and the groin, it receives some muscular and cutaneous fibres, but nothing more. Its use is to assist in returning the blood from these parts, and also by this round-about journey, and these curious connections, to establish a free communication between the *anterior and posterior cavæ*, or the blood which is returned from the anterior and posterior portions of the body. This may be a matter of considerable consequence in certain states of the constitution.

Should we have recourse to the milk vein in order to obtain the benefit of local bleeding? We should in cases of abdominal inflammation, for we should unload the vessels of the walls of the abdomen, and probably assist in unloading some of the internal vessels too, and we should abate the danger of peritoneal inflammation. For yet stronger reasons, we should have recourse to it in thoracic affection, for most of the smaller ramifications which compose this vein come from the thorax, and there is greater sympathy, and there are more numerous connections between the outer and inner portion of the wall of the chest than of the abdomen. But if we were to

have recourse to bleeding from this vein, in garget, or any inflammatory affection of the udder, we should betray our ignorance of anatomy; and still more so should we do it if we regarded this milk vein as having any further connection with the secretion of milk, than as being a kind of measure or standard of the power and development of the vascular system, with the existence of which the secretion of milk, as well as the secretions generally, is essentially connected.

THE HEART.

We can trace the veins in their course down the neck to the heart, and the arteries working their way upward from the heart, the great source of the circulation of the blood. The lungs, on either side, are inclosed in a separate and perfect bag; each lung has its distinct pleura or membrane. The heart lies between these two membranes; and, more perfectly to cut off all injurious connection between the lungs and the heart—all communication of disease—the heart is inclosed in a pleura, or bag, of its own, termed the pericardium. This membrane closely invests the heart; it supports it in its situation, prevents too great dilatation when it is gorged with blood, and too violent action when it is sometimes unduly stimulated. Notwithstanding the confinement of the heart by the pericardium, it beats violently enough against the ribs under circumstances of unusual excitation; and were it not thus tied down, it would often bruise and injure itself, and cause inflammation in the neighboring parts.

INFLAMMATION OF THE PERICARDIUM.

This membrane is occasionally the seat of obscure, unsuspected, and fatal diseases. The cow is a greedy animal; she swallows almost everything that comes in her way. She will pick up large pins, needles, and nails. A friend of ours lost a cow from some disease which neither he nor the medical attendant understood. On opening her, a piece of wire, two inches in length, was found sticking in the pericardium, and which had produced extensive ulceration and gangrene there.

We are strongly inclined to believe that these diseases occur oftener than has been suspected; these pointed substances, which in other animals take very strange but generally comparatively harmless courses, in order to work their way out of the body, select in the cow this dangerous and fatal course. The proprietors of cattle, and of cows particularly—for the cow chiefly, or almost alone, has this strange propensity—should be careful as to the manner of feeding them.

THE HEART.

In all animals the existence of life is connected with, or rather dependent upon, the constant supply of fresh arterial blood. There is not a secretion that can be performed, or a function discharged, or a single motion accomplished, without the presence of this vital fluid. The heart is the grand engine by which it is circulated through the frame. It is a large muscle, or combination of muscles, totally independent of the will, and working without cessation and without fatigue, from the first day of existence until its close. It is the forcing pump by which the vital current, having completed its course, is made to flow again and again to every part of the system. It consists of four cavities, surrounded by muscular walls, which, stimulated by the organic nerves, can contract upon, and drive out, and propel forward, the fluid which they contain, and then, left to themselves, can instantly re-assume their open dilated state by their inherent power of elasticity.

A portion of the blood has completed the circulation, and enters the upper cavity of the heart—the right auricle—where it accumulates as in a reservior, until there is enough to fill the second and lower cavity on the same side—the right ventricle—when the auricle suddenly contracts and drives the blood forward into the ventricle. But this blood is in a venous state, having just come from the veins, and will not support life ; then it must change its character before it is thrown back again into the circulation. It must be conveyed into the lungs, there to be exposed to the influence of the atmospheric air, and purified, and arterialized. For this purpose, the ventricle, stimulated by nervous energy, contracts, and as it contracts, it drives a little of the blood back, but it forces more under a dense fringed membrane which hangs around the opening between the auricle and the ventricle, and this membrane, thus raised up all round, closes the opening, and prevents the return of the principal part of the blood that way, and it is urged through another opening into the lungs.

These fringes, which, in the dilated state of the ventricle, hang loose, but which are forced up as the blood insinuates itself behind them when the ventricle contracts, discharge the function of a perfect valve : they are tied down to a certain extent by cords attached to their edges, and which spring from certain fleshy or muscular columns that arise within the ventricle. The edges, therefore, are permitted to be elevated, until they have attained a horizontal direction, and meet each other, and perfectly close the opening, and then are stopped by these tendinous cords, which oppose their strength to the further elevation of the fringes, and that regulated or increased by the muscular power of the columns beneath.

In the ox, the venous system is very large. The vessels are

numerous and large, and blood in large quantities pours on toward the right auricle and ventricle of the heart. These tendinous cords, and the muscular columns beneath, are very large and strong, in order to afford adequate resistance to the greater pressure of the blood. In this ventricle, there is also a band or fleshy muscle, running across from one side to the other, the double effect of which is beautifully evident, viz., to prevent this cavity from being too much dilated, or possibly ruptured, when the blood flows rapidly into the heart; and to assist the ventricle in contracting on the blood. A smaller and more tendinous band runs across the same ventricle, lower down, and for the same purpose. From the peculiar arrangement of the circulatory system, there is always this pouring on of blood to be arterialized; for the secretion of milk, or the deposition of fat, constitute the daily, unremitting duties of the animal. There is given, not only to provide against accident, but to fit the heart for this incessant hard work, this supplemental muscle, in the form of a fleshy band stretching across from one side to the other, preventing dilatation and assisting in contraction.

The blood is driven out of the right ventricle into the lungs, and is there exposed to the action of the atmospheric air, and purified; thence it is returned to the left auricle, passes into the left ventricle, and, by the contraction of that cavity, is propelled through the arteries.

The aortas are the large vessels which first receive the blood from the heart in order to carry it through the body. The vessels from the left ventricle, which carry the arterial blood through the frame, and those from the right ventricle, that convey the venous blood to the lungs, alike spring from the muscular and fleshy septum, or wall, that separates the cavities of the heart, and divides that organ into two distinct parts. The ventricles of the heart of the ox have constant and hard work to do, and additional strength is given by the insertion of a bone into the septum at the base of these arteries, more belonging to the aorta than to the pulmonary artery, but meant as a support to both.

The heart is subject to inflammation. It is principally recognized by the strength of the pulse, and by the bounding action of the heart, evident enough when the hand is placed on the side of the chest, and which may be seen and heard even at a distance.

THE ARTERIAL SYSTEM.

The blood is carried on through the arteries by the force of the heart. These are composed or three coats; the outer, or elastic, by which they yield to the gush of blood; the muscular coat, by which the artery contracts again when the gush of blood has passed; and the inner, or smooth, glistening coat, which lessens the friction of the blood against the side of the vessel, and its consequent gradual retardation in its course.

THE PULSE.

The muscular coat of the artery can be felt giving way to the gush of blood: and the expansion of the artery, as the blood passes, is called *the pulse.* Every one who knows the least about cattle is sensible of the importance of the indications to be obtained by the pulse. The heat of blood may be felt at the root of the horn; and the rallying of the blood round some important, but inflamed part, may be guessed at by means of the coldness of the ear, or the extremities: but by the pulse we ascertain the state of the general system, and the increased force or debility of that central machine on which every secretion and every function depends. It has been stated that the pulse is not easily felt at the jaw. The temporal artery will generally be sufficiently distinct; but it will be most convenient to ascertain the beating of the heart itself, by placing the hand on the left side, a little within and behind the elbow. The average pulse of a full-grown healthy ox is about forty.

THE CAPILLARIES.

The blood continues to circulate along the arteries, until they and their ramifications have diminished so much in size, as to be termed *capillaries,* or *hair-like tubes,* although many of them are not one-hundredth part so large as a hair. The heart ceases to have influence here. No force from behind could drive the blood through vessels so minute. Another power is called into exercise, namely, the influence of the organic motor, or moving nerves, on the muscular sides of these little tubes.

This is by far the most important part of the circulation. The blood is carried through the arteries mechanically, and without change in them; it is returned through the veins mechanically, and almost without change in them also: but it is in the capillary system that every secretion is performed, and that the nutrition of every part is effected. The arteries and veins are mere mechanical tubes; the capillaries are connected with the vital principle—they are portions of life itself.

INFLAMMATION.

The arteries are subject to *inflammation,* yet so rarely in the ox as to render it unnecessary to detain us in describing it; but a similar affection of the capillaries constitutes the very essence and the most dangerous part of every other disease. Inflammation is increased action of these vessels. When the increased action is confined to a few capillaries, or a small space, or a single organ, the inflammation is said to be local; but when it embraces the whole of the system, it assumes the name of fever

If inflammation be the consequence of increased action of the capillaries, the object to be effected is to reduce that inordinate action to the healthy standard, before the part has become debilitated or destroyed by this overwork. Bleeding is one of the most effectual measures, and especially local bleeding. The increased action of the vessels, and the consequent redness, heat and swelling of the part, are at once the consequence of inflammatory action, and tend to prolong and to increase it. A copious bleeding, therefore, by relieving the overloaded vessels, and enabling them once more to contract on their contents, is indicated. To this physic will follow, and there is scarcely an inflammatory disease in the ox in which it can, by possibility, be injurious. Mashes and cooling diet will be essential.

As to external applications, they will be best treated of when the different species of inflammation are discussed; but, as a general rule, in superficial inflammation, and in the early stage of the disease, cold lotions will be the most useful; in cases of deeper-seated injury, and of considerable standing, warm fomentations will be preferable. The first will best succeed in abstracting the inflammatory heat; the other will relax the fibres of the neighboring parts, which press upon, and perpetuate, the injury, and will also restore the suspended perspiration. Cases, however, continually occur in which the most opposite treatment is required in different stages of inflammation.

FEVER.

We have described fever as general capillary action, and with or without any local affection; or it is the consequence of the sympathy of the system with inflammation of some particular part. The first is called *pure* or *idiopathic* fever; the other *symptomatic* fever.

Pure fever is frequent in cattle. A beast, yesterday in good health, is observed to-day—dull, the muzzle dry, rumination and grazing having quite ceased, or being carelessly or lazily performed, the flanks heave a little, the root of the horn is unnaturally hot, the pulse is quickened, and is somewhat hard. The animal is evidently not well, but the owner cannot discover any local affection or disease; he gives a dose of physic; perhaps he bleeds; he places a mash before his patient, and, on the following day, the beast is considerably better, or well; or possibly, the animal, although apparently better in the morning, becomes worse as the day advances, and at about the hour, or a little later, when he was seen on the preceding day. This is but a slight attack of fever, without local affection, or intermittent fever, still without local determination, and which goes on for three or four days, returning, or being aggravated at a particular hour, until by means of *cordial purgatives* the chain is broken.

At other times, the fever remains without these imtermissions.

It increases daily, notwithstanding the means employed, and at length assumes the form of pleurisy, or enteritis, or some local inflammatory complaint. The general irritation has here concentrated itself on some organ either previously debilitated, or at that time predisposed to take on inflammation. It is pure or idiopathic fever, assuming, after a while, a local determination. This is a serious, and frequently a fatal case; for the whole system having been previously affected, and, probably, debilitated, and disposed to take on inflammatory action, the proper remedies cannot be so fearlessly and successfully used. Local means of abating inflammation must here be pushed to their full extent.

Symptomatic fever is yet more frequent and dangerous. No organ of consequence can be long disordered or inflamed, without the neighboring parts being disturbed, and the whole system gradually sharing in the disturbance. By the degree of this general affection, by the heat of the mouth, and the frequency of the pulse, a judgment is formed not only of the degree of general disturbance, but of the intensity of the local affection. The subsidence of the pulse, and the return of the appetite, and the recommencement of rumination, are indications both of the diminution of the general irritation, and the local cause of it.

Some have denied the existence of this essential fever in cattle, but the facts that have been stated cannot be doubted. It would be scarcely necessary to recur to this were there not so many instances of bad and dangerous practice in the early treatment of these cases. If fever were plainly recognized, the owner or the surgeon would be more anxious to get rid of the local affection before the system was materially affected; and if he was aware of pure and essential fever, he would endeavor to remove it before it took on local determination. These are the golden rules of practice, which no nonsensical theories should cause any one for a moment to forget.

INFLAMMATORY FEVER—THE BLOOD—BLOOD-STRIKING—BLACK-LEG—QUARTER-EVIL, OR BLACK-QUARTER.

Thousands of cattle fall victims every year to a disease, which, from its virulent character and speedy course, may be termed inflammatory fever. A disease of this character, but known by a number of strange yet expressive terms, is occasionally prevalent, and exceedingly fatal among cattle in every district. It is termed black-quarter, quarter-evil, joint-murrain, blood-striking, shoot of blood, &c.; and although it may not, at any time, embody all the symptoms of either of these diseases, according, at least, as they are understood in some parts of the country, there are few cases in which the prevailing symptoms of most of them are not exhibited in some of the stages.

Cattle of all descriptions and ages are occasionally subject to inflammatory fever; but young stock, and those that are thriving most rapidly, are its chief victims. So aware is the proprietor of young short-horn cattle of this, that while he is determined to take full advantage of their unrivalled early maturity by turning them on more luxuriant pasture than prudence would always dictate, he endeavors to guard himself by periodical bleeding, or by the insertion of setons in the dewlap of all his yearlings. This disease is sometimes epidemic, that is, the cattle of a certain district have been pushed on too rapidly; they have lurking inflammation about them, or they have a tendency to it; and, by-and-bye, comes some change or state of the atmosphere which acts upon this inflammatory predisposition, and the disease runs through the district.

There are few premonitory symptoms of inflammatory fever. Often without any, and generally with very slight indications of previous illness, the animal is found with his neck extended; his head brought, as much as he can affect it, into a horrizontal position; the eyes protruding, and red; the muzzle dry; the nostrils expanded; the breath hot; the root of the horn considerably so; the mouth partly open; the tongue enlarged, or apparently so; the pulse full, hard, and from 65 to 70; the breathing quickened and laborious; the flanks violently heaving, and the animal moaning in a low and peculiar way.

Sometimes the animal is in full possession of his senses, but generally there is a degree of unconsciousness of surrounding objects: he will stand for an hour or more without the slightest change of posture, he can scarcely be induced to move, or when compelled to do so, he staggers; and the staggering is principally referable to the hind quarters; rumination has ceased, and the appetite is quite gone. After a while he becomes more uneasy, yet it is oftener a change of posture to ease his tired limbs, than a pawing: at length he lies down, or rather drops; gets up almost immediately; is soon down again; and debility rapidly increasing, he continues prostrate; sometimes he lies in a comatose state; at others, there are occasional but fruitless efforts to rise. The symptoms rapidly increase: there is no intermission; and the animal dies in twelve to twenty-four hours.

In a majority of cases, and especially if the disease has been properly treated, the animal seems to rally a little, and some of the symptoms appear, from which the common names of the disease derive their origin. The beast attempts to get up: after some attempts he succeeds, but he is sadly lame in one or both of the hind quarters. If he is not yet fallen, he suddenly becomes lame; so lame as to scarcely be able to move. He has *quarter-evil—joint-murrain.*

This is not always an unfavorable symptom. The disease may be leaving the vital parts for those of less consequence. If the apparent return of strength continues for a day or two, we may en-

courage some hope, but we must not be sanguine ; for it is too often only a temporary and delusive respite.

One of the symptoms now most to be dreaded is the rapid progress of that which has already begun to appear—tenderness on the loins and back. The patient will not bear even the slightest pressure on these parts. The case is worse if to these be added swellings about the shoulders, and back, and loins, with a peculiar crackling emphysematous noise, as if some gas were extricated in the cellular membrane, and the process of decomposition had commenced during the life of the animal. Worse even than this is the appearance of sudden, hard, scurfy patches of what seems to be dead skin. It is a kind of *dry gangrene*, and it is the commencement of a sloughing process, extensive and rapid to an almost inconceivable degree. Now, we have *black-quarter*, with all its fearful character.

The ulcers first appear about the belly, the quarters, and the teats, but they spread everywhere, and particularly about the mouth and muzzle. The mouth is invariably ulcerated, and the tongue is blistered and ulcerated too ; and there is either a discharge of sanious, offensive, or bloody fluid from the nose and mouth, or considerable hæmorrhage from both of them. Now, the urine, which had before been high-colored, becomes darker, or bloody ; the dung likewise has streaks of blood over it, and both are exceedingly fetid.

In this state the animal may continue two or three days, until it dies a mass of putridity ; unless there has been an honest, active assistant, who never shrinks from his duty, and who will properly dress the ulcers and administer the medicines. Many a beast has been saved even at this point of the disease. The first favorable symptom will be a slight diminution of the fetor—the ulcers will then speedily heal, and the strength return.

The chief appearance after death will be venous congestion everywhere. The larger and the smaller veins will be black, and distended almost to bursting. It is a striking illustration of the peculiar vascular system of the animal, and speaks volumes as to the mode of treating this and similar diseases.

The congestion is everywhere. It affects both of the pleuras, the intercostal and the pulmonary, and the whole substance of the lungs. It extends over the peritoneum, and more particularly over the mucous membrane of the intestines ; and patches of inflammation and ulceration are found in every part of the colon. These are the appearances when the animal is carried off during the inflammatory stage of the disease.

If the complaint has assumed a putrid type, there is effusion, the smell of which can scarcely be borne, both in the chest and belly ; with adhesion and agglutination of all the small intestines ; often

vomicæ in the lungs, and effusion in the pericardium. Every stomach is inflamed, and the fourth ulcerated through. The substance of the liver is broken down. There are ulcerations generally of the smaller, and always of the larger, intestines; and in every part of the cellular membrane there are large patches of inflammation running fast into gangrene.

There cannot be a doubt respecting either the nature or treatment of such a disease. It is, at first, of a purely inflammatory character, but the inflammation is so intense as speedily to destroy the powers of nature. The capillary vessels must have been working with strange activity, in order to fill and to clog every venous canal. The congestion prevails in the cranium as well as in other parts, and the distended vessels press upon the substance of the brain, and that pressure is propagated to the commencement of the nerves; and hence debility, and staggering, and almost perfect insensibility. As the congestion early takes place, the coma, or stupor, is early in its appearance.

The nervous energy being thus impeded, the power of locomotion seems first to fail; then general debility succeeds, and at length other parts of the vascular system are involved. The mouths of the excretory ducts can no longer contract on their contents; hence fluid is effused in the chest and in the belly, and in the cellular membrane; and hence, too, the rapid formation of others. The vital powers generally are weakened, and in consequence of this there is the speedy tendency of every excretion to putridity, and the actual commencement of decomposition, while the animal is yet alive. The blood shares in this abstraction or deficiency of vitality, and hence the disposition to ulceration, gangrene, and dissolution, by which the later stages of the disease are characterized.

Inflammatory fever, although not confined to young stock, is far most prevalent among them. It appears principally in the spring and fall of the year, for then we have the early and late flush of grass. On poor ground it is comparatively unknown; but the young and the old stock, in thriving condition, need to be closely watched when the pasture is good and the grass springing. If it be at times epidemic, it is only when the season, or the eagerness of the farmer, have exposed the constitution to an excess of otherwise healthy stimulus, and when the animal is in a manner prepared for fever.

When the early part of the spring has been cold and ungenial, and then the warm weather has suddenly set in, nothing is so common as inflammatory fever; but the change in the temperature, or other qualities of the atmosphere, has had only an indirect effect in producing this; it is the sudden increase of nutriment which has done the mischief. When cattle are moved from a poor to a more luxuriant pasture, if the new grass be sufficiently high, they distend the paunch almost to bursting, and hoove is the result; but if the

change be more in the quality than in the quantity of the food, the evil is more slowly produced, and it is more fatal—a disposition to inflammation is excited, which wants but a slight stimulus to kindle into a flame. It is the penalty which the breeder must pay, or the evil which he must carefully, and not always successfully, endeavor to avoid, when he is endeavoring to obtain all the advantage he can from the richness of his pasture, the aptitude to fatten, and the early maturity, of his cattle. Milch cows are, generally speaking, exempt from inflammatory fever.

Inflammatory fever is sometimes caused by the driving of fat beasts in the beginning of summer with too much hurry. It has broken out among stall-fed cattle still later in the year, when the process of fattening has been injudiciously hastened. In fact, from the peculiar vascular system of cattle, the excitement of too much food is the usual cause of inflammatory fever in them. The vascular system is most subject to disease in the ox, for we keep him, as nearly as we can with any rational hope of safety, in a state of plethora.

The very name of the disease, *inflammatory fever*, indicates the mode of treatment. In a case of excessive vascular action, the first and most important step is copious bleeding. As much blood must be taken as the animal will bear to lose; and the stream must flow on until the beast staggers or threatens to fall. Here, more than in any other disease, there must be no foolish directions about quantities. *As much blood must be taken away as can be got;* for it is only by bold depletory measures that a malady can be subdued that runs its course so rapidly.

Purging must immediately follow. Epsom salts are here, as in most inflammatory diseases, the best purgative. A pound and a half, dissolved in water or gruel, and poured down the throat as gently as possible, should be the first dose; and no aromatic should accompany it. If this does not operate in the course of six hours, another pound should be given; and, after that, half-pound doses every six hours until the effect is produced.

At the expiration of the first six hours the patient should be carefully examined. Is the pulse slower, softer? If not, he must be bled a second time, and until the circulation is once more affected. If the animal be somewhat better, yet not to the extent that could be wished, the practitioner would be warranted in bleeding again, provided the sinking and fluttering of the pulse does not indicate the commencement of debility.

If the pulse be a little quieted, and purging has taken place, and the animal is somewhat more himself, the treatment should be followed up by the diligent exhibition of sedative medicines. A drachm and a half of digitalis, and one drachm of emetic tartar, and half an ounce of nitre, should be given three times every day; and setons

inserted in the dewlap. Those of black hellebore-root are the best, as producing the quickest and the most extensive inflammation.

If the animal be not seen until the inflammatory stage of the fever has nearly passed, the skill of the practitioner will be put to the test. Has the animal been bled? if it has not, nothing can excuse the neglect of bleeding now, except debility too palpable to be mistaken. It may perhaps be more truly affirmed, that even that should be no excuse. This congestion of blood is a deadly weight on the constitution, which the powers of unassisted nature will not be able to throw off. It must be very great debility, indeed, which should frighten the practitioner from this course; and debility which, in ninety-nine times out of a hundred, would terminate in death. As a general rule in this stage of the disease, the effect of bleeding should certainly be tried; but cautiously—very cautiously—and with the finger constantly on the pulse. If the pulse gets rounder and softer as the blood flows, the abstraction of blood will assuredly be serviceable; and if the pulse becomes weaker, and more indistinct, no harm will have been done, provided that the orifice be immediately closed.

Physic will, in this stage of the disease, also be indispensable; but double the usual quantity of the aromatic should be added, in order to stimulate the rumen, if the drink should get into it, and also to stimulate the fourth stomach and the whole of the frame, if fortunately it should reach so far as this stomach. A pound of the Epsom salts at first, and half-pound doses afterwards, until the bowels are opened, will be sufficient in this stage; and if, after the fourth dose, (injections having been given in the meantime,) purging is not produced, the quantity of the aromatic, but not of the purgative, may be increased. It is probable that the medicine has found its way into the rumen, where it will remain inert until that cuticular and comparatively insensible stomach is roused to action by the stimulus of the aromatic. No other medicine should be given until the bowels have been opened; and in many cases very little other medicine will afterwards be required.

The bowels having been opened, recourse should be had once more to the pulse. If it indicate any degree of fever, as it sometimes will, (for the apparent debility is not always the consequence of exhaustion, but of vascular congestion,) the physic must be continued, but the constitution would perhaps be too weak for the direct sedative medicine. On the other hand, however, no tonic medicine must be given. If, however, the pulse be weak, wavering, irregular, giving sufficient intimation that the fever has passed, and debility succeeded, recourse may be had to tonic medicines. The tonics, however, which in such cases would be beneficial in cattle, are very few. Mineral tonics have rarely produced any satisfactory result—but in gentian, calombo, and ginger, the diseases of cattle find almost everything to be wished.

The two first are excellent stomachics, as well as tonics; the last is a tonic, simply because it is the very best stomachic in the cattle pharmacopœia. They may be given three times every day, in doses of a drachm each of the two first, and half a drachm of the last. They will be more effectual in these moderate doses than in the overwhelming quantities in which some administer them, and in which they oppress and cause nausea, rather than stimulate and give appetite. They should always be given in gruel, with half a pint or even a pint of sound ale.

The practitioner may possibly be called in after ulcers have broken out, and the sloughing process has commenced: there must be no bleeding then; the vitality of the system has received a sufficient shock, and various parts of it are actually decomposing; but physic is necessary, with a double dose of the aromatic, in order to rouse the energies of the digestive system, and to get rid of much offensive and dangerous matter collected in the intestinal canal. Epsom salts will here also constitute the best purgative. The enlargements about the knee, and elbow, and stifle, and hock, should be fomented with warm water; and any considerable indurations, and especially about the joints, embrocated with equal parts of turpentine, hartshorn, and camphorated spirit.

The ulcers should be carefully and thoroughly washed several times every day with a solution of the chloride of lime, of the strength already recommended. The ulcers about the muzzle, mouth, and throat, should be treated in a similar manner; and a pint of the solution may be horned down twice in the course of the first day. If there be hoose or bloat, this will combine with the extricated gas, and prevent the continued formation of it; and it will materially correct the fetor which pervades the whole of the digestive canal. Mashes and plenty of thick gruel should be offered to the beast, and forced upon him by means of the stomach-pump if he refuse to take it voluntarily. In this case, the pipe should not be introduced more than half-way down the œsophagus, as there will then be greater probability of the liquor flowing on into the fourth stomach.

Tonics should on no account be neglected, but be administered simply to rouse to action the languid or almost lifeless powers of the frame.

If the stench from the ulcers does not abate, the solution of the chloride should be quickly increased to a double strength; but as soon as the fetor has ceased, and the wounds begin to have a healthy appearance, the healing ointment or the tincture of aloes may be adopted, and the latter is preferable. When the animal begins to eat, he should be turned into a field close at hand, the grass of which has been cropped pretty closely. A seton or a rowel should be retained for three or four weeks; but as for medicine, it cannot be too soon discontinued when the animal is once set on its

legs. When art has subdued the disease, nature, although slowly, will most successfully resume her wonted functions.

The breeder has much in his power in the way of prevention. His cattle should be carefully examined every day. Any little heaving at the flanks, or inflammation of the eyes, or heat-bumps on the back, or rubbing, should be regarded with suspicion, and met by a gentle purgative, or the abstraction of a little blood; but the decided appearance of inflammatory fever in one of them will not be misunderstood for a moment; it will convince him that he has been making more haste than good speed, and in the disease of one he will see the danger of all. All who have been subject to the same predisposing causes of disease, should be bled and physicked, and turned into a field of short and inferior keep.

Prevention of this malady is the only cure worth notice. A piece of short or inferior keep should be reserved as *a digesting place*, in which the cattle may be occasionally turned to empty and exercise themselves. Those observed to advance very fast may be bled monthly for several months; but occasional purges of alterative medicines would prevent those diseases which seem to take their rise in over-repletion and accumulation, and are far better than bleeding. These periodical bleedings increase rather than lessen the disposition to make blood and fat.

This disease differs materially in its symptoms in different districts, and in the same district at different times. The difficulty lies in the other diseases with which the inflammatory fever is combined—sometimes one, and sometimes another, assuming a prominent character; and while they all generally follow inflammatory fever, yet some of them occasionally precede it.

In some places, the first symptoms are those of *quarter-ill*. The cattle are seized first in one quarter, and then in the other. The skin puffs up, and the crackling noise is heard almost from the beginning. The disease is usually fatal when it assumes this form.

In others, where, from the rapidity with which it runs its course, it is called the *speed*, it also generally begins behind. Inflammation, or rather mortification, seizes one hock. It runs up the quarter, which becomes actually putrid in the couse of an hour or two, while the other limbs continue sound. Few, especially young beasts, survive an attack of this kind. Here the active use of local applications is indicated; and yet they will rarely be of much service.

In other parts, under the name of the *puck*, the fore-quarter, or the side, is the part mostly affected; and the animal frequently dies in an hour or two. On skinning the beast, the whole quarter appears black from the extravasation of blood, and is softened and decomposed, as though it were one universal bruise.

Homœopathic treatment.—The principal remedy for the treatment of this fever is *aconitum*, which should be repeated at intervals, so

much shorter, according as the disease is more severe; for instance, from every eight to fifteen minutes in very acute cases, and which must be continued until a perceptible calm be restored. In external inflammatory diseases, especially those which arise from a traumatic lesion, *aconitum* is applicable not only to prevent the fever, but also to cure it when it is already developed, and has as yet made no progress. Notwithstanding the great efficacy of *aconitum*, it does not suffice in many cases to effect a complete cure, so that, according to the individual nature of the inflammation, other diseases being connected, it becomes necessary to assist its action by that of other different means; *belladonna* in encephalitis; *spongia marina* in angina; *bryonia* in pneumonia and peri-pneumonia; *arsenicum* and *rhus toxicodendron* in enteritis; *cantharides* in cystitis and nephritis, &c.

TYPHUS FEVER.

This is a species of fever with which every farmer is too well acquainted. It is of a low chronic, typhoid form. It sometimes follows intense inflammatory action, and then it may be deemed the second stage of that which has just been considered; but often, there have been no previous symptoms of peculiar intensity, at least none that have been observed, but a little increased heat of the ears, horns, and mouth; a pulse of sixty or seventy; a certain degree of dullness; a deficiency of appetite; an occasional suspension of rumination; a disinclination to move; a gait approaching to staggering; and a gradual wasting. These are plain indications that there is a fire burning, and rapidly consuming the strength of the animal. The vital energies are evidently undermining; *but the fire is smothered.* It is not phthisis (consumption), it is not inflammatory fever, for the intense inflammation characterizing that is seldom seen—*it is true typhus fever.*

As soon as it becomes established, diarrhœa succeeds; and this is either produced by small doses of medicine from which no danger could be suspected, or comes on spontaneously. It is not, however, violent, but continues day after day. It bids defiance to the skill of the most experienced practitioner, or, if arrested for a while, is sure to return. The discharge is peculiarly fetid; occasionally mixed with blood, and generally containing a considerable quantity of mucus.

Three or four weeks have probably now elapsed, and then succeed the peculiar symptoms of *low fever* in cattle. Tumors form round the joints, or appear on the back or udder; ulcerate, spread, and become fetid. The sweet breath of the ox is gone—it is as offensive as the ulcers, and, in fact, we have that which can scarcely be distinguished from the second stage of inflammatory fever.

It is most prevalent in the spring and fall of the year, and when

the first has been ungenial and the latter wet. The pasture generally possesses some degree of luxuriance, although its herbage may be coarse, and the beast is usually in good condition when first attacked.

This disease has sometimes been epidemic and fatal to a dreadful extent, occasionally assuming the form of, or being connected with, epidemic catarrh; at other times accompanied by dysentery, but frequently being, for many a day, or for some weeks, typhoid fever without any local determination.

The cause of typhoid fever is involved in much obscurity. It is most prevalent on cold, wet lands, and during cold, wet, variable weather. A long wet winter is sure to be followed by typhus fever in every low, marshy district. In the higher pastures, where the cattle seem exposed to greater cold, but have less wet, little of it is seen.

It is much to be doubted whether it is infectious; but if one, then all the cattle have been exposed to the same predisposing causes of disease. It is well to remove the infected beasts from the sound ones as soon as possible; and the carcass of the animal that dies of inflammatory or typhoid fever should be buried without delay.

These are cases which puzzle, and, when treated in the best way, they too frequently will not yield to medical skill. There is one rule, however, which cannot mislead. *If there be fire, it must be put out.* No apparent debility should mislead here. That debility may, and often does, result from the presence of fever, and not from any dangerous impairment of vital power; and the incubus being thrown off, nature will rally; at all events, the debility is the consequence of the fever, and is daily and rapidly increasing while the fever continues: therefore, first bleed, and bleed until the character of the pulse begins to change. It should never be forgotten that one bleeding of this kind will often do good, and cannot be injurious. It is the fear of bleeding lest the animal should be more debilitated, or the pushing on of the bleeding, in order to obtain a definite quantity, after the pulse has begun to falter, that has done all the mischief.

If the heat, and heaving, and disinclination to food should have been relieved by this bleeding, but should threaten to return, more blood should be taken, but with the same caution as to the pulse.

Physic must follow, but with caution; for there is a natural tendency to diarrhœa connected with this disease, which is often troublesome to subdue. One dose of Epsom salts should be given with the usual quantity of aromatic medicine, and its action secured and kept up by half-pound doses of sulphur, administered as circumstances may indicate.

To this will follow the usual sedative medicine—digitalis, emetic tartar, and nitre. The practitioner must not be deluded here. While the mouth and horns are hot, and the pulse rapid, tonics would be

poison. *He has to put out the fire, and not to feed it.* When the fever is subdued, but nature finds some difficulty in rallying, we may give gentian, colombo, and ginger, with advantage.

When the tumors and ulcerations appear, the second stage of inflammatory fever is established, and the measures recommended for that must be adopted. This disorder attacks cattle of all ages. Full-grown beasts are more subject to typhoid than to inflammatory fever; but among younger ones and weaning calves, and those of eight, nine, and ten months old, it is extremely fatal, for they have not strength to bear up against this secretly consuming fire.

The mode of prevention, when it first breaks out, is to bleed and physic; the grand thing of all, however, is to remove not merely to shorter, but to dryer pasture. With the youngsters, bleeding may, perhaps, be dispensed with; but a dose of physic should be given, and a seton inserted in the dewlap; and the change of pasture is indispensable. Low and damp situations do not agree with cattle; and the inhabitants of low, marshy grounds have too often a sad account to render of their cattle.

Homœopathic treatment.—Bryonia, twice a day, is the remedy best suited to the entire course of the disease. *Acidum muriaticum* should be given when there is great debility and dryness of the mouth; *arnica*, when the animal remains stretched without motion, and without consciousness; *stramonium* and *hyoscyamus*, if partial convulsions are observed to take place; *arsenicum* in watery diarrhœa; *china*, *argilla*, and *sulphur*, when the food comes away undigested; *belladonna*, in convulsions and wildness of look; *opium*, when the animal is stretched out as if dead, with small pulse, hard fæces, or constipation; *veratrum*, in diarrhœa with cold extremities.

THE VEINS.

The principal disease of the capillary vessels having thus been disposed of, the blood must be again traced back to the heart.

By means of the various important functions which are discharged by the capillaries, the blood is essentially changed as it traverses them. It becomes black, venous, and no longer capable of sustaining life; and it must be sent back to the heart, to be again rendered arterial. The capillaries in which the blood has undergone this change begin to unite, and when a sufficient number of them have joined their streams, that branch is called a vein. The coats of the vein are much weaker and thinner than those of the artery, and the blood flows through them by a different principle from that which produces the circulation either in the arteries or capillaries.

All the veins of the limbs, or that are subject to the pressure of any of the muscles, have valves, which permit the blood to flow on towards the heart, but oppose an insuperable obstacle to its course in a contrary direction; thus, by the pressure of the muscles, a con-

siderable power is, occasionally at least, called into exercise to propel the blood along the veins. All the veins, however, are not under the influence of these muscles. The large veins of the chest and belly are out of the reach of muscular pressure, and are destitute of this valvular apparatus, but they are acted upon by a more powerful principle.

The heart has been described as an elastic muscle. It has scarcely closed by the stimulus of the organic nerves, when it expands again by its own inherent elasticity; and that important principle, by the influence of which the water follows the sucker in the common pump—the pressure of the atmosphere—acts here, too, and the cavities of the heart are filled again as soon as they expand; and this living pump would work on while there was fluid in circulation. Thus the circulation is maintained by the action of the heart, while the blood is passing through the arteries; by the muscular power of the capillaries, while it permeates those little vessels; and by the pressure of the muscles and the valvular apparatus of the veins, in some part of its course through them; and by atmospheric pressure, through their whole extent.

VARICOSE VEINS.

Varicose tumors in the cow seldom appear, except in the veins of the udder, and in the neighborhood of joints that have suffered even more than usual from the tumors of these parts, to which cattle are so liable. An old cow that has been a superior milker, frequently has the veins of the teats permanently enlarged. No application will take down the swelling, which, however, is rarely of any serious inconvenience. The veins of the teats are sometimes much enlarged under *Garget*. Warm fomentations, in order to abate the general inflammation of the bag, will afford most relief.

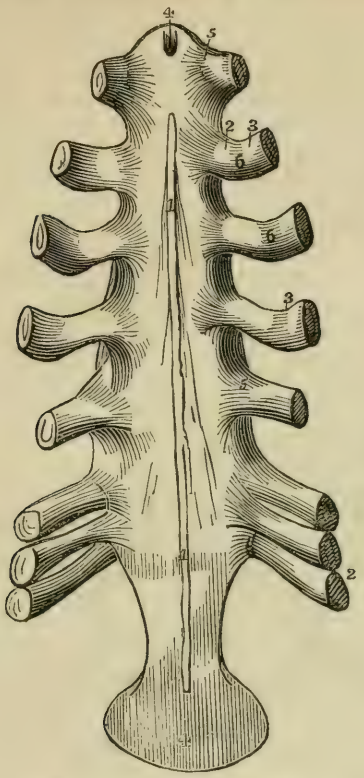
THE CHEST.

The form of the chest is of much consequence in the ox. There are important offices to be performed by the viscera of the chest, which demand constant energetic action, over which the mind has no control, and where all depends on the form and extent of the thoracic cavity. The blood must be purified, and it must be circulated through the frame, and that with a rapidity and perfection which must not know a moment's intermission.

The chest consists of 13 ribs on either side, or 26 in the whole. Of these 8 on each side are directly connected with the *sternum*, or breast bone, and are termed *true* ribs; the other five are attached to cartilages, which are linked together, and also connected with the sternum in an indirect manner—these are termed *false ribs*.

The true ribs are long, large, thick, and far apart from each other;

for, in consequence of the small number of short, or false ribs, they take a more backward direction, and cover a portion of the abdomen above, while the sternum supports it below. They are so formed as to render the cavity of the chest of a quite circular shape.



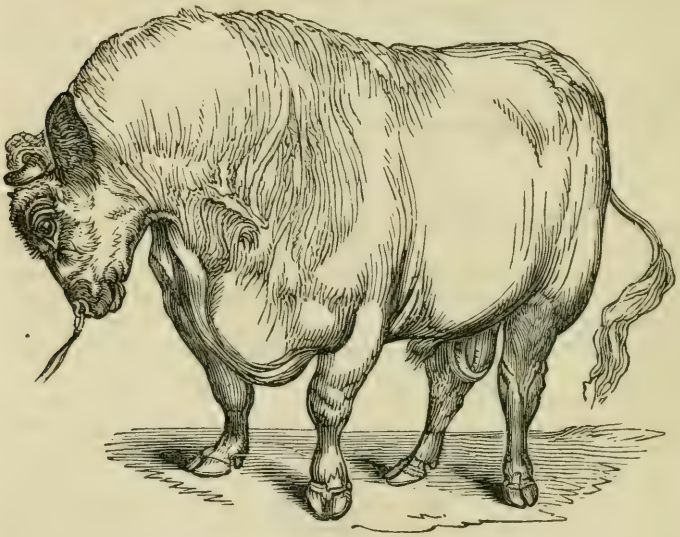
THE BREAST-BONE OF THE OX.

1. The body of the sternum, (so called from its resemblance to the stern of a ship,) or breast-bone.
2. The cartilages by which the ribs are attached to the sternum.
3. The ribs cut off.
4. The xiphoid cartilage, (resembling a sword,) at the posterior part of the sternum, supporting the rumen.
5, 5. The joints, with their capsular ligaments, uniting the cartilages with the sternum.
6, 6. Do., uniting the cartilages with the ribs.

7. The socke treceiving the movable bone at the point of the sternum.

In the ox, as the above cut will show, the sternum is thin and flat. It presents a level surface of considerable width for the floor of the chest, and, therefore, insures a circular form for the chest.

Breadth at the breast is an essential requisite in the ox. It is this conformation alone which will give sufficient surface for the attachment of muscles of the character of those of the ox, and will secure sufficient room for the lungs to purify, and the heart to circulate blood enough for the proper discharge of every function. The following cut of the breast of a short-horn bull will afford a practical illustration of these observations.



A SHORT-HORN BULL.

The flatness of the breast-bone at the base of the chest of the ox secures a *permanent* sufficiency of capacity; and a *perfect* joint between the ribs and the sternum is not only not wanted, but might interfere with the equable action of the respiratory apparatus in this animal. The union, however, between the rib and the sternum does admit of a considerable degree of motion, and would, to a great extent, contribute to the enlargement of the chest, if rapid action, or accident, or disease, should require it.

The sternum of the ox has a process projecting very considerably

anteriorly, but not closing the entrance into the chest. That process, or first division of the sternum, has a joint. It admits of a certain degree of lateral action only. It materially assists the walking or other action of the animal, and appears to be absolutely necessary, when we consider the vast accumulation of flesh and fat about these parts; and especially that singular collection of them, the brisket.

The muscles which are most concerned in giving bulk to the breast are the *transverse pectorals*. They form the grand prominences in front of the chest, and extend from the anterior extremity of the sternum to the middle of the arm.

The great pectoral (fig. 13, p. 209,) arising from the lateral and the posterior part of the sternum, may be considered more as a continuation of the muscles of the breast, extending laterally and backward.

THE BRISKET.

This is a singular portion of the breast of the ox, to which, very properly, much importance has been universally attached, although, perhaps, on false grounds. It has been considered as a part of the anterior wall of the chest, and as a proof of its depth and capacity. This is altogether erroneous. It is a mere appendix to the chest. It is a projection of substance, partly muscular, but more cellular and fatty, from the anterior and movable division or head of the sternum, extending sometimes from 12 to 20 inches in front of it, and dipping downward nearly or quite as much. It is no proof of depth of chest. It is found of a great size in all the improved cattle, varying in size in different breeds, and in different cattle of the same breed; and it was always looked for and valued in the better specimens of the old cattle. It is, at least, a proof of tendency to fatness. A beast that will accumulate so much flesh and fat about the brisket, will not be deficient in other points.

It is very probable that this may be carried too far. An enormously projecting brisket may evince a more than usual tendency to fatten; but not unfrequently a tendency to accumulate that fat irregularly—to have it too much in patches, and not spread equally over the frame. Many examples of this must present themselves to the recollection of the grazier, and especially in some of the short-horn breed. In a very few instances it has been almost fancied that this enormously projecting brisket was a defect, rather than an excellence; at least, that it somewhat impaired the uniform beauty of the animal, if it did not diminish his sterling excellence.

The brisket should be prominent as well as deep; perhaps on one account more prominent than deep, for it will then be more likely, either before or by the time it arrives at the posterior border of the elbow or fore-arm, to have subsided to the thickness of the fatty and

other substance naturally covering the sternum. One defect, but not of half the consequence which it is generally supposed to be, would then be avoided—the apparent diminution of the chest at its bottom under the body at the girthing place, or immediately behind the elbows under the body. Some have evidently considered this to be an actual elevation of the floor of the chest, and a consequent lessening of its capacity at this point; and, on that account, a most serious defect. There are few things which the breeders of short-horns have labored more zealously, and generally more unsuccessfully, to remedy. It is certainly a defect, because it evinces a disposition to accumulate fat in a somewhat patchy manner; but it is not so bad as has been represented or feared. It indicates no elevation of the sternum—no diminution of the capacity of the chest: it is a rather too sudden termination of protuberance of the brisket, either from the accumulation of the principal part of its substance too forward, or from a want of disposition in the beast to fatten in an equable way. If the brisket were removed, the bicast-bond would be found to be gradually rounding, and rising from this spot, and not let down lower between the elbows. It will be interesting to compare the different forms of the brisket in the different breeds of cattle. The bulls on pp. 96 and 238 will show how much variety can exist in different animals of the same breed; and those who recollect the portrait of Mr. C. Colling's Comet, to whose brisket few, perhaps, could at first reconcile themselves so far as beauty or form was concerned, will be aware of greater variety still.*

When the observer now admires or wonders at the protuberant and unwieldy briskets of these cattle, he will recognize the use of the joint in the first, or supplementary, bone of the sternum of oxen. They could not walk with ease, and it would be scarcely possible for them to turn at all, if it were not for the lateral motion which this joint permits. The muscles most concerned in this action, and, indeed, that constitute the bulk of the fleshy part of the brisket, are the anterior portions of the external and internal *sternocostal* muscles, (those which are concerned with the sternum and the ribs,) and whose action is to elevate the ribs, and so dilate the chest, and assist in breathing.

THE RIBS.

The first rib on either side is a short, rather straight, and particu-

* It is to be observed that the views here expressed about short-horn briskets are those of the breeders of rival races. All short-horn breeders hold it an important point to have the brisket project in front, and drop as low and be as wide between the legs, as possible. As short-horns are more and more spread over England, this their wonderful peculiarity is more and more admired; and the breeders of other races are imitating it, as far as attainable in their breeds, and in one, the Herefords, it is, in some high bred stocks, well advanced. It will suffice to say that short-horn breeders do not admit that a large brisket indicates a tendency to fat unevenly; but the contrary, and deem it an evidence of superior feeding capacity of an even kind.—*Am. Ed.*

larly strong bone. It has much of the head and neck to support; and it is the fulcrum or fixed point on which all the other bones are to move. Each rib is united to the spine by great strength of attachment. They spring from the spine in a quite horizontal direction; and consequently, there is a provision for the capacity of the chest above as well as below. They are large, for the attachment of much muscle; they spring out at once laterally, in order to secure that permanent capacity of chest which the functions of the ox require.

In some breeds a little flat-sidedness (the less the better) may be forgiven, because the width of the sternum below, and of the spine, in some degree, but more particularly the *springing out* of the ribs above, secure a sufficient capacity of chest. It is on this account that the Devon ox is active and profitable while at work, and afterward grazes kindly. The conformation of the bones just described gives him a considerable capacity of chest, notwithstanding his somewhat too flat sides: yet in the animal which was chiefly valued for his grazing properties, something more would be looked for, and would be found.

The shoulder being past, this horizontal projection of the ribs is more and more evident; and, in order that the barrel-form shall be as complete as can be, each rib is twisted. Its posterior edges are turned upward and outward; and as, proceeding backward, each projects beyond the preceding one, not only until the eighth true rib is passed, but also the five false ones, the carcass of a well-made, profitable beast increases in width and in capacity, until we arrive at, or nearly at, the loins. For illustration of this, reference may be made to the cuts of the Kyloe, Galloway, New Leicester, or Shorthorn cattle.

In point of fact, however, the thorax is now passed, and the abdomen presents itself; but the principle is the same: the ribs are spread out, not only to afford room in the thorax for lungs considerably larger than those of the horse, but for that immense macerating stomach, the rumen, wich fills the greater part of the abdomen, and which must be preserved as much as possible from injury and pressure.

THE SPINE.

The spine of the ox has great size of the individual bones, a small quantity of elastic ligamentous substance interposed between them, and great length and roughness of all the processes. Two objects are accomplished—sufficient strength is obtained for the protection of the parts beneath, and for the purposes for which the animal may be required, and as much roughened surface as possible for the insertion of muscles. As the joints are few, some provision seems to be made for this, by their being complicated.

The spinous processes of the anterior bones of the back, constituting the withers, are strong but short. While a very slight curve should mark the situation of the withers, the irregularity of the processes of the bones should never be visible. The less the curve the better, and no decided hollow behind should point out the place where the withers terminate, and the more level surface of the back commences; as this is a departure from good conformation, for which nothing can compensate. It not only takes away so much substance from the spot on which good flesh and fat should be thickly laid on, but it generally shows an indisposition to accumulate flesh and fat in the right places.

THE LARYNX.

At the posterior part of the pharynx, and at the top of the windpipe, we find a curiously constructed cartilaginous box, called *the larynx*. It is the guard of the lungs, lest particles of food, or any injurious substance, should penetrate into the air-passages, and it is at the same time the instrument of voice. (See cut, p. 196.) Every portion of food, whether swallowed or returned for the purpose of re-mastication, passes over it; and it would be scarcely possible to avoid frequent inconvenience, and danger of suffocation, were it not for a lid or covering to the entrance of this box, termed the epiglottis, (fig. 5,) which yields to the pressure of the food passing over it, and lies flat on the entrance into the windpipe, and, being of a cartilaginous structure, rises again by its inherent elasticity as soon as the pellet has been forced along, and permits the animal to breathe again. The whole of the larynx is composed of separate cartilages, to which muscles are attached, that regulate the size of the opening into the windpipe, as the voice or alteration in breathing from exertion or disease, may require. Fig. 11 gives a view of the *rimæ glottidis*, or edge of the *glottis*, or opening into the windpipe. It is small, because little speed is required in the labor of the ox, and there is rarely any hurried or distressed breathing.

But although the opening into the windpipe is small, there is danger of substances getting into it, for all the food passes thrice over it; and at its first passage is formed into a very loose and imperfect pellet. Provision is made for this; the epiglottis of the ox is broad: it more than covers the opening into the windpipe. The breathing is seldom hurried, and the food passes often over the opening, and therefore the epiglottis is broad and rounded, (fig. 5, p. 196,) and overlapping on either side, and at the angle of the opening; the cartilage of which it is composed is thin, its rounded extremity is curled—turned back—so as to yield *and be pressed down*, and give an uninterrupted passage, and securely cover the opening when the food is returned; while also, from its thinness, it yields in

another way, and *uncurls* and covers the opening when the food is swallowed.

The arytænöid cartilages (fig. 6) are small in the ox: the thyröid cartilages (fig. 7) are large. The interior of the larynx of the ox—the organ of voice—is more simple than in any other domesticated animal. There is neither membrane across the opening, nor are there any duplicatures of membrane resembling sacs within the larynx; in fact, his voice is the least capable of modulation of any of our quadruped servants.

THE WINDPIPE.

The *trachea*, or windpipe, of cattle is small, because much air is not wanted. The ox is not a beast of speed, and he rarely goes beyond the walk or trot. The cartilaginous rings are narrow (fig. 9, cut, p. 196), and thick. The interposed ligamentous substance is weak (fig. 10, p. 196). A tube of loose construction is sufficient for the portion of air which the ox needs in respiration; and gathering usually the whole of his food from the ground, and gathering it slowly, and being longer occupied about it, more freedom of motion, and a greater degree of extension, are requisite.

In addition to this, there is no careful and intricate overlapping of the cartilages behind; they are simply brought into approximation with each other; and their opposing edges project behind so that they are very loosely bound to the cervical vertebræ. There is no transverse muscle, because the caliber of the tube can seldom or never be much varied, but, by way of compensation, the lining membrane of the trachea is dense, extensible, and elastic, and capable of discharging, although imperfectly, a function similar to that of the transverse muscle. At the lower part of the windpipe, the triangular prolongation of cartilage for the defence of the tube in the immediate neighborhood of the lungs is small. The rings of the windpipe of the ox are about 60.

TRACHEOTOMY.

Although there are few diseases of cattle in which the animal is threatened with suffocation, yet occasionally in blain, in inflammation of the parotid gland, and in those varieties of fever which in the ox are so much characterized by the formation of tumors, there will be pressure on the windpipe, much contracting its caliber, and rendering the act of respiration laborious, and almost impracticable. In inflammation of the larynx, to which cattle are much exposed, the distressing labor of breathing is scarcely credible.

Tracheotomy, or the formation of an artificial opening into the windpipe, is an operation very easily and safely performed. The

beast should be secured, and the hair cut closely from the throat, over the windpipe, and opposite to the fifth or sixth ring. The skin is then tightened by the finger and thumb, and an incision is made through it, at least three inches in length. This must be carefully dissected off from the parts beneath, and then a portion of the windpipe, half an inch wide, and an inch in length, carefully cut out. The lips of the wound should be kept open by threads passed through the edges and tied over the neck, until the pressure or inflammation above no longer exists, and then they may be brought together and the wound healed.

It is wonderful what instantaneous and perfect relief this operation affords. The beast that was struggling for breath, and seemed every moment ready to expire, is in a moment himself.

In cases of permanent obstruction, as tumor in the nostrils, or distortion of the larynx or trachea, the animal will generally be consigned to the butcher; but instances may occur in which it is desirable to preserve the beast for the sake of breeding, or for other purposes. Then a tube may be introduced into the opening, two or three inches long, curved at the top, and the external orifice turning downward, with a little ring on each side, by which, through the means of tapes, it may be retained in its situation. A favorite cow or bull might be thus preserved, but extraordinary cases alone would justify such a proceeding.

THE THYMUS GLAND, OR SWEETBREAD.

There is an irregular glandular body, of a pale pink color, situated in the very fore part of the thorax, vulgarly called the sweetbread. In the early period of the life of the fœtus, it is of no considerable size, and is confined mostly to the chest; but during the latter months it strangely develops itself. It protrudes from the thorax; it climbs up on each side of the neck, between the carotids and the trachea, and reaches even to the parotid gland, and becomes a part of that gland. It cannot be separated from the parotid; and when cut into, a milky fluid exudes from it.

Very soon after birth, however, a singular change takes place; it spontaneously separates from the parotid; it gradually disappears, beginning from above downward; and in the course of a few months not a vestige of it remains along the whole of the neck. It then more slowly diminishes within the chest; but at length it disappears there too, and its situation is occupied by the thoracic duct.

It is evidently connected with the existence of the animal previous to birth, and more particularly with the latter stages of fœtal life. It seems to be part of the nutritive system. It pours a bland and milky fluid through the parotid duct into the mouth, and so into the stomach, in order to habituate the stomach by degrees to the digest-

ive process, and to prepare it for that function on which the life of the animal is to depend; and also to prepare the intestines for the discharge of their duty. When, after birth, it begins to be separated from the parotid gland, it has no means of pouring its secretion into the stomach, and it gradually dwindles away, and disappears.

THE BRONCHIAL TUBES.

The windpipe pursues its course down the neck, until it arrives at the chest. It there somewhat alters its form, and becomes deeper and narrower, in order to suit itself to the triangular opening through which it is to pass. It enters the chest, and preserves the same cartilaginous structure until it arrives at the base of the heart, where it separates into two tubes, corresponding with the two divisions of the lungs. These are called the *bronchial tubes*. They plunge deep into the substance of the lungs; these presently subdivide; and the subdivision is continued in every direction, until branches of the trachea penetrate every portion of the lungs. These are still air-passages, and they are carrying on the air to its destination, for the accomplishment of a vital purpose. The lungs of the ox afford the most satisfactory elucidation of the manner in which these air-tubes traverse that viscus. They can be followed until they almost elude the unassisted sight, but the greater part of them can be evidently traced into the *lobuli*, or little divisions of the substance of the lung, which are so evident here. The minute structure of these lobuli has never been demonstrated; but we may safely imagine them to consist of very small cells, in which the bronchial tubes terminate, and to which the air is conveyed; and that these cells are divided from each other by exceedingly delicate membranes.

THE ALTERATION OF THE BLOOD.

The blood has already been described as sent from the right ventricle of the heart into the lung, and the blood-vessels dividing and subdividing until they have attained a state of extreme minuteness, and then ramifying over the delicate membrane of these cells. The blood, however, is in a venous state; it is no longer capable of supporting life; and it is forced through the lungs, in order that it may be rendered once more arterial, and capable of supporting life and all its functions. For this purpose, these minute veins spread over the delicate membrane of the cells, and for this purpose also, the air has been conveyed to these cells by the bronchial tubes.

Now, the chemical, it may almost be said the vital, difference between venous and arterial blood is, that the venous is loaded with carbon, and deficient in oxygen. It here comes, if not in absolute contact with atmospheric air, yet so close as to be separated only by a gossamer membrane, which offers little obstacle to the power of

chemical affinity or attraction; and the carbon which it contains is attracted by the oxygen which abounds in the atmospheric air, and is taken out of the circulation, and passes off in breathing. Carbonic acid gas, or fixed air, is formed by the union of the oxygen and the carbon, the presence of which in undue quantities renders the air destructive to life. The other constituents of the blood have also an affinity for oxygen, and more of that gas is taken from the atmospheric air, and passes through the membrane of the air-cells, and mingles with the blood.

The change, then, from venous to arterial blood consists in the carbon being taken away, and oxygen imbibed; and this is effected by the blood being brought so nearly into contact with atmospheric air, of which oxygen is a constituent part, and which has a greater affinity for carbon, and other principles in the blood, than it has for the gases with which it was combined in the constitution of atmospheric air.

The capillary vessels, now carrying arterial instead of venous blood, unite and form larger and yet larger vessels, until the united stream is poured into the right cavity of the heart, thence to be propelled through the frame. This subject has been treated at somewhat greater length, because the lungs of the ox afford the best illustration of the division of the bronchial tubes, and the separation of the substance of the lungs into distinct lobuli, or little lobes, in which the bronchial tubes terminate, and the air-cells are developed.

CATARRH, OR HOOSE.

Anatomical detail may now, for a considerable time, be laid aside, and inquiry be made into the diseases of the respiratory organs. Those only of the first of the air-passages, that of the nose, have as yet been considered; however, inflammation spreads beyond the lining membrane of the nasal cavities, and involves the fauces, the glands of the throat, and the upper air-passages generally; it is then no longer coryza, but is CATARRH, or better known by the term HOOSE. This is a disease too little regarded in cattle, but the forerunner of the most frequent and fatal diseases to which they are subject.

It is often hard to say whence catarrh, or common cold, arises. The slightest change of management or of temperature will sometimes produce it. In the beginning of spring, and towards the latter part of autumn, it is particularly prevalent. Young beasts, and cows after calving, are very subject to it. In a great many cases, however, it is the result of mismanagement. When cattle are crowded together, they are seldom without hoose. If the cow-house be heated considerably above the temperature of the external air, it is sure to be there. Many a sad cold is caught at the straw-yard, and particularly by young cattle: the food is not sufficient to afford

proper nourishment, or to keep up proper warmth; and the more forward drive the others about, and permit them to obtain only a small portion of their proper share of the provender, and then the depressing effects of cold, and wet, and hunger, so debilitate these poor beasts, that they are seldom without catarrh—and that catarrh too frequently runs on to a more serious disease.

Some breeds are more subject to hoose than others. The natives of a southern district are seldom naturalized in a colder clime without several times passing through severe catarrh; and, where the system of breeding *in and in* has been carried to too great an extent, and been pursued in defiance of many a warning, hoose, perpetually occurring, difficult to remove, and degenerating into confirmed phthisis, will painfully, but somewhat too late, convince the farmer of his mistake.

The principal error, however, of the agriculturist is, not that he suffers the causes of hoose to exist, or always gives them existence, but that he underrates the mischievous and fatal character of the disease. To this point we shall refer again and again; and if we can but induce him to listen to the dictates of humanity and of interest, the present treatise may rank among those which have diffused some useful knowledge.

There is no disease of a chronic nature by which cattle are so seriously injured, or which is eventually so fatal to them, as hoose; yet very few of those whose interest is at stake, pay the slightest attention to it. The cow may cough on from week to week, and no one takes notice of it until the quantity of milk is seriously decreasing, or she is rapidly losing flesh, and then medical treatment is generally unavailing. The disease has now reached the chest; the lungs are seriously affected; and the foundation is laid for confirmed consumption.

It is far from the wish of the author to inculcate a system of overnursing. He knows full well that those cattle are most healthy that are exposed to the usual changes of the weather, yet somewhat sheltered from its greatest inclemency. He would not consider every cow that hooses as a sick animal, and shut her up in some close place, and physic and drench her, but would endeavor to prevail on the farmer to be a great deal more on the look-out. The herdsman should be aware of every beast that coughs. It may be only a slight cold, and in a few days may disappear of itself. He may wait and see whether it will, unless there be some urgent symptoms; but, these few days having passed, and the cow continuing to hoose, it begins to be imperatively necessary for him to adopt the proper measures, while they may be serviceable.

If she feed as well as ever, if moisture stand upon her muzzle, and her flanks are perfectly quiet, then one or two nights' housing, and a mash or two, or a dose of physic, may set all right. But if the

muzzle be a little dry, and the root of the horn hot, and she heaves (although not much) at the flanks, and the coat is not so sleek as usual, and she is a little off her feed, let her be bled. Experience will teach the farmer that these chest affections, in cattle, often and speedily assume a highly inflammable character, and that they must be conquered at the first, or not at all.

To bleeding should succeed a dose of Epsom salts, with half an ounce of ginger in it, to prevent griping and to promote perspiration, and to excite the rumen to action; but no hot, stimulating drinks. To this should be added warmth, warm mashes, warm drinks, warm gruels, and a warm but well ventilated cow-house.

Cough and Fever Drink.—Take emetic tartar, one drachm; powdered digitalis, half a drachm; and nitre, three drachms. Mix, and give in a quart of tolerably thick gruel.

Purging Drink.—Take Epsom salts, one pound; powdered caraway-seeds, half an ounce. Dissolve in a quart of warm gruel, and give.

It will be proper to house the beast, and especially at night; and a mash of scalded bran with a few oats in it, if there be no fever, should be allowed. It is necessary carefully to watch the animals that are laboring under this complaint; and, if the heaving should continue, or the muzzle again become or continue dry, and the breath hot, more blood should be taken away, and the purging drink repeated. At the close of the epidemic catarrh, the animal will sometimes be left weak and with little appetite. It should be well ascertained whether the fever has quite left the beast, because listlessness and disinclination to move, and loss of appetite, and slight staggering, may result as much from the continuance of fever as from the debility which it leaves behind. If the muzzle be cool and moist, and the mouth not hot, and the pulse sunk to nearly its natural standard, or rather below it, and weak and low, the following drink may be ventured on:

Take emetic tartar, half a drachm; nitre, two drachms; powdered gentian root, one drachm; powdered chamomile flowers, one drachm; and powdered ginger, half a drachm. Pour upon them a pint of boiling ale, and give the infusion when nearly cold.

When the beast begins to recover, he should not be exposed in any bleak situation, or to much rough weather.

In some years this epidemic disease destroys a great many cattle. In the winter of 1830, and in the spring of 1831, thousands of young cattle perished in every part of the country. Some of them were carefully examined after death, and the membrane lining the windpipe was found to be inflamed, and the inflammation extending down to and involving all the small passages leading to the air-cells of the lungs, and the passages filled with worms.

There are some substances which are immediately destructive to

worms when brought into contact with them. Some of these medicaments may be taken into the circulation of the animal with perfect safety to him, and probably death to the worms. Among those which most readily enter into the circulation after being swallowed, is the oil or spirit of turpentine. The breath is very soon afterwards tainted with its smell, which shows that a portion of it has passed into the lungs. Therefore, when other means have failed, and the continuance of the violent cough renders it extremely probable that worms are in the air-passages, the following prescription may be resorted to:

Turpentine Drink for Worms.—Take oil of turpentine, two ounces; sweet spirit of nitre, one ounce; laudanum, half an ounce; linseed oil, four ounces. Mix, and give in a pint of gruel.

This may be repeated every morning without the slightest danger; and even when we are a little afraid to give it longer by the mouth, it may be thrown up in the form of an injection. A pint of lime water every morning, and two table-spoonfulls of salt every afternoon, have also been administered with advantage when worms are present in the windpipe.

Should the case appear to be obstinate, the exhibition of half doses of physic every second or third day will often be useful, with the following drink, morning and night, on each of the intermediate days:—

Take digitalis, one scruple; emetic tartar, half a drachm; nitre, three drachms; powdered squills, one drachm; opium, one scruple. Mix, and give with a pint of gruel.

A seton in the dewlap should never be omitted; and if the disease seems to be degenerating into inflammation of the lungs, the treatment must be correspondingly active.

The termination of hoose that is most to be feared is consumption. That will be indicated when the discharge from the nose becomes purulent, or bloody, and the breath stinking, and the cough continues to be violent, while the beast feeds badly, and the eyes begin to appear sunk in the head, and he rapidly loses flesh. The best remedy here, so far as both the owner and the animal are concerned, is the pole-axe of the butcher; for in the early part of the disease the meat is not at all injured, and may be honestly sold. If, however, it is wished that an attempt should be made to save the animal, the cough and fever drink may be given daily; more attention should be paid to the warmth and comfort of the beast; and, if the weather be favorable, it should, after a while, be turned out, either entirely, or during the day. Care, however, must be taken to protect the animal from all storms; and if it be summer, green food should be given in the stable.

Homœopathic Treatment.—A cough, at first dull and hollow, excited by the least effort, and more particularly violent after the

animal has drunk, generally indicates a more or less serious affection of the lung. If a severe cough attack the animal, great attention must be paid to it, because in such cases we frequently have to treat commencing hydrothorax. The means to be adopted when no other symptoms of disease are observed, are: *dulcamara*, in cough by cold; *bryonia* (in repeated doses,) in inveterate cough; *belladonna* and *drosera*, in chronic cough; *hyoscyamus*, when the attacks are very frequent; *squilla*, in cough which comes on after fatigue, and which interferes with the respiration; *chamomilla*, in dry cough, with diarrhœa; *pulsatilla*, in frequent attacks of dry cough, with loss of appetite; *spiritus sulphuratus*, in very obstinate cough. When the cough is the symptom of another disease, it yields to the treatment required by the latter.

When the entire system has suffered more or less, the affection is accompanied with fever of greater or less severity; some doses of *aconitum*, the first remedy to be employed in such cases, never fail to produce excellent effects. If the cold affect but a part of the body, we scarcely ever observe any fever, and *bryonia* is to be administered. In many cases considerable benefit has been obtained from *dulcamara*, *nux vomica*, and *rhus toxicodendron*. *Arsenicum* is good when the digestion is disturbed, or the complaint has been occasioned by a cold drink.

EPIDEMIC CATARRH.

Catarrh occasionally assumes an epidemic form; it spreads over whole districts; is more than usually violent; associates with itself the symptoms of other and of worse diseases, and is strangely fatal. If a cold yet variable spring succeeds to a wet and mild winter, there will be scarcely a dairy or a straw-yard in some districts in which a considerable number of cows will not labor under distressing hoose. Obstinate costiveness attends the early stage of this disease, on which neither Epsom salts, nor common salt, nor linseed oil, can make any impression. All seems to go into the rumen, and has for a while no power on the cuticular coat of that stomach; and then, whether the purgative course be pursued or suspended, diarrhœa suddenly comes on, and bids equal defiance to all astringent medicines. Sometimes, however, diarrhœa is present, and obstinate from the very beginning.

Tumors about the head, the roots of the ears, the neck, the back, and loins, and many of the joints, soon succeed, accompanied by a singular crackling sound when pressed upon. There is decomposition going on everywhere, and in the cellular texture among the rest, accompanied by the extrication of gas, the passage of which among the cells beneath the skin is the cause of this crackling.

While these tumors indicate decomposition in one part, the appearance and odor of the fæces show that it is not inactive in the

intestinal canal. The discharge is offensive to a high degree, the breath loses its peculiar and beautiful scent, and the vital powers are rapidly exhausted.

In most of these epidemics, the first attack seems to be made on the powers of organic life, and soon afterwards the animal system shares in the deleterious influence. The beast is unwilling to move; it scarcely can move; it staggers as it walks. It loses flesh every day; the coat stares, and clings to the bones; the appetite is quite gone; a fetid discharge commences from the mouth and nostrils, and death soon follows.

The treatment of this disease in its early stage, and when alone it can be treated with reasonable hope of success, may be characterized under two words—promptitude and vigor. The state of inflammatory fever which accompanies the early period of the disease is intense; and unless arrested, it will (as we have seen in treating of that disease) speedily exhaust every vital power; therefore, fever existing, bleeding is imperative. The quantity of blood to be abstracted will be regulated by the intensity of the inflammation, the apparent approach or commencement of debility, and the effect produced while the blood continues to flow. All of these circumstances should be most carefully attended to. If the fever rages, the ox will bear to lose much blood, and uniformly with manifest advantage. If the state of debility is evidently approaching, or has even commenced, bleeding, regulated by the pulse, and stopped the moment that that falters, will generally be beneficial: but debility being established, or the bleeding carried on after the pulse has forbidden it, the abstraction of blood will only hasten death.

Aperients should undoubtedly be administered, accompanied or not by aromatics, or the proportion of the aromatic regulated by the preponderance of fever or debility. The sulphate of magnesia will be preferred; and early recourse should be had to the stomach-pump, in the manner which has been already described, should the physic seem to accumulate in the paunch.

The other medicines will also be regulated by the symptoms. While fever continues, digitalis, emetic tartar, and nitre will be indicated. When the febrile stage is passed, spirit of nitrous ether, laudanum, gentian, and ginger will be indicated. The cow-house should be warm, yet well ventilated. Mashes should be given, and green meat of every kind, and this changed daily, if necessary, in order to humor the capricious appetite of the patient. The strength being a little renovated, the beast may be turned into some pasture, close at hand, for a few hours during the middle of the day.

Homœopathic treatment.—The principal means to be employed in such cases, as well as in the case of cough in general, are: *dulcamara* and *bryonia*, in the cough which has succeeded to a cold; *nux*

vomica, in the dry and loud cough ; *aconitum* and *arsenicum*, in that which comes on every time the animal drinks cold water ; *drosera*, in that which has already become chronic ; *pulsatilla* and *hyoscyamus*, in that which is dry and returns in kinks ; *chamomilla*, in dry cough with diarrhœa ; *ammonium muriaticum*, *cuprum*, and *bryonia*, in inveterate cough ; and, in general, *sulphur*, in many cases of distressing and more especially obstinate coughs.

THE MALIGNANT EPIDEMIC—MURRAIN.

Epidemic catarrh often assumes a malignant form in cattle, on account of the great vascularity of the system, and intensity of febrile action, and consequent vital exhaustion. It also appears as a disease which is malignant from its very commencement. Indeed there is no disease so malignant as the murrain of cattle, and there are few years in which it is not now seen in some part of the kingdom. It is ranked under the diseases of the respiratory system, because that system is usually first of all affected, and for a longer or shorter time alone affected ; but the disease gradually takes on a typhoid character, and its pestilential influence invades every portion of the frame. It principally appears in marshy and woody districts, or where under-draining has been neglected, or the cattle have been exposed and half-starved.

There are few diseases that assume, in its earlier or later stages, a greater variety of forms ; but, disarmed somewhat of its virulence, or at least having not appeared in all its terrors for some years past, it will generally be distinguished by some or the greater part of the following symptoms.

There will be cough, frequent and painful, and, in many cases, for a week or more before there is any other marked symptom. The farmer may not always be aware of this, but he will find it out if he inquires about it ; and he will be fully aware of the importance of the fact before we have done with this division of our subject.

After a few days, some heaving of the flanks will be added to the cough ; the pulse will be small, hard, frequent, and sometimes irregular ; the mouth hot ; the root of the horn cold ; the fæces sometimes hard and black, at others liquid and black, and then very fetid. Presently afterwards, that of which we have to speak again and again, is observed—extreme tenderness along the spine, and particularly over the loins.

The cough becomes more frequent and convulsive, and a brown or bloody matter runs from the nostrils and mouth ; the eyes are swelled and weeping ; the patient grinds his teeth ; there is frequent spasmodic contraction about the nostrils ; and the animal rarely lies down, or, if he does, rises again immediately.

The eyes soon afterwards become unusually dull ; the pulse remains small, but it has become feeble ; the respiration is quicker ;

the flanks are tucked up; the tenderness on the loins is removed; insensibility is stealing over the frame; and the fæces are more loaded with mucus, and more fetid. The patient moans and lows, and grinds his teeth almost incessantly; the head is agitated by a convulsive motion; blood begins to mingle with the fæces; the breath, and even the perspiration, becomes offensive; and the beast staggers as he walks.

Tumors and boils now, or often earlier, appear on various parts. If they are to come forward, the sooner they rise the better, for much depends on what becomes of them. If the animal has sufficient strength for them to go through the usual process of suppuration, although the sloughing and the stench may be greater than could be thought possible, the beast will have a chance to recover; but if there is not energy to bring them forward—if they become stationary—and most assuredly, if they recede and disappear, the patient will die.

The treatment of this disease is most unsatisfactory. If the farmer could be brought to attend more to this cough in cattle—if, here, he had recognized the violent and increasing cough, and, although he had not dreamed of murrain, had bled and physicked the beast on account of the cough, the disease would probably have been arrested, or at least its virulence would have abated.

The early stage of murrain is one of fever, and the treatment should correspond with this—bleeding. Physic should be cautiously yet not timorously resorted to. For sedative medicines there will rarely be room, except the cough should continue. Small doses of purgative medicine, with more of the aromatic than we generally add, will be serviceable, effecting the present purpose, and not hastening or increasing the debility which generally is at hand; but if the bowels be sufficiently open, or diarrhœa should threaten, and yet symptoms of fever should be apparent, no purgative must be given, but the sedatives should be mingled with some vegetable tonic. The peculiar fetid diarrhœa must be met with astringents, mingled also with vegetable tonics. In combating the pustular and sloughing gangrenous stage, the chloride of lime will be the best external application; while a little of it administered with the other medicines inwardly may possibly lessen the tendency to general decomposition. The external application of it should not be confined to the ulcerated parts alone, but it should be plentifully sprinkled over and about the beast; and the infected animal should be immediately removed from the sound ones.

Drink for Murrain.—Take sweet spirit of nitre, half an ounce; laudanum, half an ounce; choride of lime, in powder, two ounces; prepared chalk, an ounce. Rub them well together, and give them with a pint of warm gruel.

This may be repeated every six hours, until the purging is consi-

derably abated ; but should not be continued until it has quite stopped. The purging being abated, we must look about for something to recall the appetite and recruit the strength.

Tonic Drink for Murrain.—Take colombo root, two drachms ; canella bark, two drachms ; ginger, one drachm ; sweet spirit of nitre, half an ounce. Rub them together, and give in a pint of thick gruel.

There cannot be a more proper means adopted than a seton in the dewlap, made with the black hellebore root. The mouth should be frequently washed with a dilute solution of the chloride of lime. The ulcerated parts, if they are fetid, should have the same disinfectant applied to them, and the walls and ceiling, and every part of the cow-house, should be washed with it.

One caution should be used with respect to the food ; while the beast should be coaxed to eat, in order to support him under the debilitating influence of the disease, it is only on the supposition that he ruminates his food. Until he begins again to chew the cud, we are only injuriously overloading the paunch by enticing the animal to eat. Until rumination is re-established, the food should consist of gruel, or any other nutritive fluid, and should be so administered that the greater part of it may pass on into the fourth stomach, without entering the first. When the animal appears to be recovering, he should be gradually exposed to cool and open air, and very slowly permitted to return to his usual food.

When the disease is quite subdued, the cleansing of the cow-house should be seriously undertaken, and thoroughly accomplished, Let every portion of filth and dung be carefully removed, the walls, and the wood-work, and the floor carefully washed with water, or soap and water, and then every part washed again with a lotion, in the proportion of a quarter of a pound of the chloride of lime, in powder, to a bucket of water. This will be better than any fumigation that can be possibly applied. Should, however, the chloride of lime not be at hand, then a simple and cheap fumigation, on which very considerable dependence can be placed, may be resorted to.

Fumigation.—Take common salt, two pounds ; oil of vitriol, one pound.

The salt should be put in an earthen vessel, and placed in the middle of the cow-house, and the oil of vitriol gradually poured upon it. They should be stirred well together with a stick, and the person preparing the thing should retreat as quickly as he can, to prevent himself from suffering by the fumes of the chloride, closing the door carefully after him, every window and aperture having been previously closed. In a few hours he may enter the cow-house again, and remove the vessel, without any serious inconvenience.

[A remedy much used for murrain, in Holland has been brought before the American public, by J. S. Skinner, Esq., editor of the "Plow, the Loom, and the Anvil." It is this :—nitrate of potash,

170 grains; bole armenian, 20 grains. Dissolve in a pint of water, and give, to be repeated as often as required.—*Am. Ed.*]

Homœopathic treatment.—With respect to treatment, *arsenicum* is a certain means of cure and preservation. On the first symptoms of the disease being perceived, such as loss of appetite, suspension of rumination, trembling of the hind legs, staggering when walking, hair dull and rough, eyes swimming in water, alternations of heat and cold in the horns and ears, disappearance of milk, &c., a dose of *arsenicum* should be administered, which is to be repeated every five to fifteen minutes, until there is marked improvement; in slight cases one hour or an hour and a half interval may be allowed between the doses. The curative effect becomes perceptible after a very little time, and so much the sooner, in proportion as the attack was more violent; so that in the most acute cases the amendment often becomes perceptible in a quarter or in half an hour, which is recognized by the following characters: the animal shakes off the stupor, looks around it, and notices the person taking care of it; the trembling diminishes or ceases altogether, the horns and ears are less cold, or less burning; there is a little appetite, the hair lies down, the eye loses its fixedness, and the animal has an alvine discharge; the evacuations vary much, being sometimes natural, sometimes bloody or mucous; at length a general warm sweat sets in, or tumors, abscesses, or eruptions; in the case of cows the milk returns. When these signs of improvement are observed to take place, we must wait for some time before repeating the dose, being always regulated by the degree of severity with which the disease commenced; if the aggression be violent, and the first dose produces no perceptible effect, after a quarter of an hour, or, at most, half an hour, the *arsenicum* must be repeated, and then continued at the same intervals; if, on the contrary, the disease be but moderate, it is better to allow the first dose to act for an hour; and if an improvement take place, a second is not given until the amendment ceases to progress. Often a single dose suffices to remove the disease, whilst in other cases, from two to four, even from twenty to thirty, are required, before we obtain a complete cure. It is unnecessary to say that during the whole course of treatment, we should not lose sight of the patient for a moment.

Should an amendment or cure be obtained, all is not yet over; two cases may still occur.

1. A relapse of the disease. This may take place after the lapse of from four to sixteen hours. It is important then to watch the animal during twenty-four hours, and still to make it take a few doses, at intervals of about four hours. If the relapse had already taken place, we should proceed as on the former occasion; but the danger would be still greater.

2. Other circumstances supervene, which, however, are never dangerous. In different regions of the body, cold, soft, or hard tumors, of an indolent kind, form. Sometimes there remain hard indurations, or swelling of the glands and teats, with suppression or diminution of the milky secretion. Though the teat presents nothing abnormal, the milk is less abundant, or altered in its qualities. The skin is covered with small scabs succeeding pustules which contained a fluid; the eruption occupied the entire or only a portion of the body; it is accompanied with itching or not; the hair remains staring, and does not recover its brightness. The evacuations continue to be hard and scanty. There is emphysema under the skin; crepitation is felt on passing the hand over it. The skin is completely hard, and does not yield to the action of its proper muscles; the appetite and ruminations are not reëstablished.

All these sequelæ yield in a little time to the prolonged use of *arsenicum*, a dose of which is to be taken every six hours, until no trace any longer remains; which usually is the work of three or four days. The absence of appetite and sluggishness of the intestinal canal quickly yield to a few doses of *nux vomica*. The appetite almost always returns four or six hours after the first, and if the constipation continue, the medicine is to be repeated every six hours. *Spiritus sulphuratus* is employed for the eruption, and *arsenicum* for all the other ailments.

In order to preserve the animals from the disease, they are made to take, first every forty-eight hours, then every twenty-four, and lastly every twelve hours, one drop of *arsenicum* in the morning, one hour before eating, and in the evening, two hours after doing so.

THE EPIDEMIC OF 1840 AND 1841.

Since the last edition of this work was published, a new disease has appeared amongst cattle and sheep, and for the last ten years it has spread through the kingdom as an epidemic, scarcely sparing a single parish from its visitation. Though not by any means usually fatal in its effects, it has yet altogether destroyed a great number, and the pecuniary loss has been still greater from the debilitating effects which it has produced or left behind. It has been proved to be extremely infectious, and it is difficult to say whether the greater number of cases have been thus produced or spontaneously occasioned. It has sometimes appeared amongst the cattle of a farm, scarcely sparing a single case; and again, after some months' absence, it has re-appeared on the same farm amongst the sheep, or perhaps the swine. In some cases, and on some occasions, the symptoms of the disease have been very slight, and the cases have soon got well without any medical treatment; but in other cases the symptoms have been extremely severe, and attended with danger. It has

usually happened that the earlier and the later cases have been somewhat slight, and the middle ones much more dangerous. In this respect it has resembled other epidemics. The cause of this disease is contagion; and in cases of spontaneous appearance, it is brought on to the farm by hares and rabbits.

The disease is decidedly constitutional, though manifesting itself locally in a peculiar manner; its nature is that of a low fever, great debility quickly supervening, and sometimes exhibiting a tendency to putridity. If the very earliest symptoms be observed, it will generally be found that cold extremities, a staring coat, and indeed a cold fit are exhibited; but a reaction soon follows, in which the limbs become hot, and then saliva issues from the mouth, and the tongue is somewhat swollen. At the same time some degree of tenderness in the feet is manifested, and the pulse is quickened and the beast is altogether feverish. The soreness of the mouth and feet increases; small bladders are found on the tongue, the lips and other parts of the mouth, and likewise between the hoofs, and sometimes also on the teats. The animal gradually ceases to feed, from the pain experienced in the act, and sometimes the appetite itself fails. The bladders become opaque, and at length burst and discharge a watery fluid; and this increases the soreness of the parts. The flow of saliva increases, and in a few days the cuticle sloughs off. Sometimes there are swellings along the back and loins, which appear to contain air. The disease thus continues, becoming gradually more severe until four or five days from the commencement, when amendment generally takes place, and the beast gradually recovers. Sometimes, however, the complaint becomes complicated with inflammation of some organ—such as the lungs, and the danger is then much greater; or it may take on a low typhoid form, under which the animal may sink. In milch cows the udder is often affected, occasionally much inflamed, and attended with danger.

The *treatment* of this disease must be moderate in its character, and should consist in checking the fever, relaxing the bowels, healing the sores on the mouth and feet, and afterwards assisting the strength with tonics.

Bleeding should in general be abstained from, unless there be some severe local inflammation present, calculated to increase the debility; but the following laxative should be administered without loss of time:—

Take Epsom salts, half a pound; sulphur, two or four ounces; nitre, half an ounce; ginger, two drachms; spirit of nitrous ether, one ounce. Dissolved in warm water or gruel, and repeated once a day for several days.

The following liniment may be applied to the mouth several times a day:—

Take alum and white vitriol, of each half an ounce ; molasses, a quarter of a pint. Dissolve in a pint of warm water.

The feet should be carefully pared, and if much inflamed, a poultice may be applied ; but if not so, and there is a sore, equal parts of tincture of myrrh and butyr of antimony. One application of this caustic is generally sufficient, and the sore should afterwards be dressed once a day with the following :—

Astringent Powder.—Take blue vitriol, powdered, half an ounce ; powdered alum, half an ounce ; prepared chalk, two ounces ; armenian bole, one ounce.

Linseed and oatmeal gruel should be offered to drink, and mashes, with the best food that can be procured. If the weather be fine, it will be better to continue the cattle at grass ; but if housed, they should be kept clean and dry. When the bowels are relaxed, and there appears much weakness, the following tonic should be given daily :—

Take powdered ginger, one drachm ; powdered caraway seeds, one drachm ; gentian, powdered, four drachms ; spirit of nitrous ether, one ounce. To be mixed slowly with gruel.

If there should be any appearance of colic or spasm of the bowels, an ounce of laudanum may be given with the other medicine ; and if the liver be affected, a drachm of calomel may be added, and a blistering application rubbed on the right side.

Should the lungs be inflamed, it will be proper to bleed and blister the sides, or insert setons in the brisket. If the udder be affected, it should be well and frequently fomented with hot water, and the milk should be drawn with great care.

PHARYNGITES—SORE THROAT.

Inflammation of the respiratory passages is often confined to particular and to very small portions of them. The posterior part of the mouth, the pharynx, through the funnel-shaped cavity of which the food passes in order to arrive at the gullet, is peculiarly subject to inflammation : it is recognized under the term *sore throat*, and is usually accompanied with cough, and other symptoms of catarrh.

The characteristic symptoms are disinclination to food, suspension of rumination, and difficulty in swallowing. Solid food is either dropped from the mouth when partly masticated, or it is forced down by a painful effort ; liquids are generally obstinately refused, or are swallowed by a convulsive kind of gulp. There is tenderness extending from ear to ear, and usually some degree of enlargement in proportion to the inflammation of the neighboring parts, and especially the parotid glands are involved. Occasionally the irritation of the pharynx produces constriction of its muscles, and a portion of the food, both solid and fluid, is returned through the nostrils. The

cough of sore throat is a painful one, and is confined to the throat. It is often a decidedly local affection; there is not much tendency to take on inflammation in the neighboring parts; the treatment will be bleeding and physic, to abate the general fever, and stimulating embrocations, or even blisters, to subdue the local inflammation.

The great development of the ethmoid and turbinated bones in the nose of the ox, in order to increase the acuteness of smell in that animal, has already been described (p. 181). The consequence of this is, that there is but a small passage left for the air, and when the membrane of the nose occasionally sympathizes with that of the pharynx, and becomes inflamed and thickened, there ensues a difficulty of breathing, from sore throat. It is true that the ox breathes partly through the mouth, but the pharynx itself is constricted and thickened, and the breathing becomes laborious almost to suffocation: therefore sore throat should be considered in a rather serious light, and be treated with corresponding promptitude.

LARYNGITES—INFLAMMATION OF THE LARYNX.

This is a dreadful disease, and, fortunately, of rare occurrence. It is inflammation of the lining membrane of the larynx, and is attended by a quickened, loud and laborious breathing, that would scarcely be thought credible. In some exceedingly acute cases the number of respirations equals, or even exceeds, that of the pulse. The least pressure on the neck over the larynx seems to give intense pain. The treatment is bleeding, physic, blisters, and, when suffocation actually threatens, tracheotomy.

EPIDEMIC AFFECTION OF THE UPPER AIR-PASSAGES.

In low and marshy districts, and a wet, cold, ungenial spring or autumn, there is occasionally an epidemic inflammation of the pharynx, larynx, and windpipe, which differs in some respects from any of the diseases yet described, and is very fatal. The malady commences like most febrile ones, with loss of appetite and suspension of rumination; to these speedily succeed dullness, some prostration of strength, and a slight difficulty of breathing. On the following day, or in the course of a few hours, the throat becomes tender, and it is evidently a little gorged between the channel, and extending some way down the neck. The animal finds difficulty and pain in moving his head or his neck, and in swallowing the medicines or drinks which are given to him. The engorgement slowly proceeds, or seems to be stationary for a while; the fever acquires no high degree of intensity, but the languor and prostration of strength increase; sometimes there is discharge from the mouth or nose, of a purulent character, yellowish-white in color, fetid, tinged with blood, and seeming to contain particles of some mucous membrane which

has been corroded, and is coming away piecemeal. The disease frequently terminates in suffocation, about the fourth or fifth day.

On examination after death, the pharynx is generally filled with this purulent matter, and the membrane beneath is in a state of ulceration, or gangrene. The inflammatory appearance, and the gangrenous one too, extend to a greater or less distance down the gullet; they usually occupy the whole of the larynx, and often a considerable portion of the windpipe, and occasionally may be traced into the bronchial tubes. It is evidently a local affection; it is acute inflammation of the pharynx or the larynx; oftenest of the former, and sometimes of both. The contents of the thorax and the abdomen are usually free from disease.

Bleeding has been found of little service in this complaint; and it is necessary either to hasten the suppuration while the surrounding membrane and other parts retain some vital power, or to evacuate the fluid as quickly as possible. For the first purpose, blisters of various kinds, and even the heated iron, have been applied to the throat; for the second, the tumor has been lanced, however deeply it may be seated. It requires, however, an experienced veterinary surgeon to conduct any operation here, for the part is crowded with important blood-vessels, the wounding of one of which may be fatal.

When there is no great external enlargement, and yet much difficulty of breathing, and suffocation is threatened, there is reason to apprehend that the pharynx, or some factitious pouch which nature has suddenly formed for the fluid, or the guttural pouches, (yet very rarely, for they are small in the ox,) or the commencement of the communication between the mouth and the ear, are filled with pus. None but a skillful veterinary surgeon should attempt an opening in such a case. The following hints may be some guide.

PUNCTURING THE PHARYNX.

The beast must be cast, and properly secured. This must be effected with as little violence as possible, for in the struggles of the animal, and the sudden quickening of the breathing, suffocation may ensue in a moment. If there be a little greater enlargement on one side than on the other, the animal should be cast with that side upward. The operator should now have the head of the patient moderately extended, and then he will ascertain the situation of the middle of the anterior edge of the atlas, or first bone of the neck (*n.*, p. 143). Close upon this, or connected with it, he will find the posterior edge of the parotid gland. He should elevate the skin, and, taking the edge of the atlas as a guide, and following its direction, he should make his incision about two, or not exceeding three inches in length, but no deeper than the skin and the cellular substance, and the centre of his incision should answer to the centre of the rounded

edge of the atlas. A thin layer, partly muscular and partly fibrous, will now present itself. It belongs to the subcutaneous muscle of the neck, and it lies upon the parotid gland. He should dissect through it carefully, and if his first incision has been a correct one, he will come upon the posterior edge of the parotid gland. This he must separate cautiously from the atlas, and from the cellular tissue by which it is tied down, and elevate, or turn it aside, as far as the middle of the space which separates the atlas from the mastoid process.

The forefinger must now be introduced into the opening. There is first felt a layer of soft parts, and then the superior lateral branch of the hyoid bone, from the extremity of which a flat muscle—the stylo-hyoideus (fig. 13, p. 203)—goes to the styloid process of the occipital bone. Immediately under this muscle lies that portion of the pharynx which is connected with the guttural tube of the ear; and now, the back of the instrument being turned towards, or touching the parotid gland, and the edge of it towards the ear, and the head being somewhat more extended in order to change a little the situation of the carotids and nerves, the bistoury is plunged through the muscle into the pharynx beneath.

Sometimes the whole of the fluid cannot be evacuated through this first incision, and a new one must be sought in a more downward direction. A curved sounding instrument must be introduced into the first orifice, and the end of it made to press against different parts of the cavity, until it can be plainly felt externally between the bifurcation of the jugular: every important vessel and nerve will be in this way pushed aside, and the point of the sound may be cut down upon without danger.

Pharyngitis, laryngitis, inflammation of the windpipe, in short, all inflammation of the air-passages, are termed *angina*, homœopathically; and the treatment of one of these diseases will be a *formula* for all of them, and each of them should be treated as here indicated.

Homœopathic treatment.—The first remedy in this oftentimes rather dangerous disease, is *aconitum*, which generally suffices when we have recourse to it in time; we are to administer from two to four doses within the space of from three to four hours. If the respiratory organs are more especially affected, so that the respiration is difficult, loud, whistling, or if there be a swelling, painful externally, some doses of *spongia marina* are to be given. *Hepar sulphuris* has been found very effectual in the second case, and likewise *bryonia*. When the angina affects more particularly the organs of deglutition, so that liquids cannot be swallowed, and return always by the nostrils, the look of the animal being fixed and wild, *belladonna* acts as a specific. *Capsicum* is suitable in inflammation of the mucous membranes of the throat, with kinks of coughing, and without any appreciable fever. *Antimonium crudum* may also be then tried with success.

When an external lesion, as a blow, &c., has occasioned external swelling and inflammation of the neck, in consequence of which an angina has supervened, we are to give some doses of *aconitum*, then *arnica*, which are sufficient in many instances, unless the inflammation has made too much progress. If, after the inflammatory symptoms have been removed, there remain a swelling in the neck, we should have recourse to *baryta carbonica*, and when that is not sufficient, to *hepar sulphuris*.

BRONCHITIS.

When catarrh begins to spread, and to involve the lower and more important air-passages, it attacks the bronchial tubes oftener than any other portion of the respiratory apparatus, and is inflammation of the lower and minuter air-passages, It used to be called inflammation of the *lungs* in cattle, and is so considered by the majority of farmers and cow-leeches; but since the improvement of veterinary science, this distinction, one of some moment, has been established. Bronchitis, however, is seldom pure; it is the prevailing disease, but it is complicated with slighter inflammation of the neighboring substance of the lungs. Bronchitis is rarely sudden in its attack. It is preceded, and generally for a long time, by cough, which becomes more and more frequent and painful, and husky and wheezing.

Here, then, is another motive for attention to the hoose of cattle. Simple catarrh may do little harm; but the inflammatory affection will gradually involve other and more important membranes, inflammation of which is generally fatal. Bronchitis is the intermediate step between catarrh and consumption, and it unfortunately is that step which, if once taken, the other must follow. We may, therefore, except when the disease assumes an epidemic character, (which it not unfrequently does, and particularly in young cattle,) attribute it to the neglect or mismanagement of the herdsman or the owner.

The existence of bronchitis may usually be detected by a gradual change of the countenance; a sunken, anxious, haggard look; a rapid and laborious breathing, attributable, at first glance, to something more than mere catarrh, however severe that may occasionally be; a cough, painful to a very great degree, and against the full action of which the animal strives as much as he is able, so that it is not full and perfect, but *husky* and *wheezing*. There is a very considerable disinclination to move, which is easily accounted for; for inflammation of the bronchial membrane is accompanied by thickening of it, and by the secretion of a quantity of viscid mucus, so that the passages are, to a considerable degree, obstructed. This gives a consciousness of the danger of suffocation, and occasionally the disease terminates in suffocation. The slightest motion aggravates the cough; and motion of a sudden kind sadly oppresses and terrifies the animal. The breath is hot. The seat of inflammation being

deep, no pain is indicated when the side of the animal is pressed upon, or lightly struck, and the animal does not gaze anxiously at its sides. The most important of all, and marking the fatal progress of the disease, the animal loses flesh rapidly, to a very great extent, and becomes a mere skeleton.

To young cattle bronchitis is particularly destructive, and the symptoms and accompanying circumstances are very singular. A yearling is often observed to have a cough peculiarly distressing. If bled, and setoned, and physicked, the symptoms will sometimes rapidly abate; but in most cases remedial measures are applied in vain. The cough continues as distressing as ever. The intermissions are short, and the paroxysms exceedingly violent. The beast is off his feed, hide-bound, his belly tucked up, his coat staring, his flank heaving, and it is painful to hear him cough. This occurs principally on low, marshy woody lands.

The animal at length dies, and the whole of the bronchial passages are found to be completely choked up with worms. They are of the *strongylus* species, and mostly the *filaria*. Many of them are also found in the windpipe; and the mucous membrane both of the windpipe and the bronchial passage presents an appearance of the intensest inflammation.

Worms are oftenest found in an injurious quantity in a moist state of the atmosphere, or in moist situations, and especially in those which abundantly produce the vegetables and grasses peculiar to such a locality; and also in young subjects, and in those whose constitution is somewhat enfeebled.

Bronchitis, when not attended with all the violent symptoms that characterize the existence of worms in young cattle, should be treated like other inflammatory complaints. Bleeding will, as usual, be the first remedy, and it should be carried to the extent which the pulse will allow; in general, however, the ox will not, in this complaint, bear the loss of so much blood as in other chest affections. To this should follow physic, and the sedative medicines already recommended, with mashes, &c.

In some cases a favorable termination of the disease has been produced; but in the bronchitis with worms there are exceedingly few cases of successful treatment. No drug can be brought to bear upon these worms directly; for no fluid at all can pass into these tubes. Diluted chlorine gas might be inhaled. It might be breathed more readily, if an artificial opening were made into the larynx. Other symptoms of bronchitis, and particularly the feeling of suffocation, might also be relieved or removed by this.

The animal would, probably, be much annoyed by such inhalation; he might cough for a while with even greater violence; but the worms dying, or their hold being loosened, they might be expelled through the natural or artificial opening by the very urgency

of the cough. That veterinary surgeon or agriculturist would deserve well who puts this fairly to the test.

There is another mode of going to work, and one that promises occasional success. There are certain drugs that are taken up by the lacteals, or by some of the absorbent vessels, and carried into the circulation, and produce their effect by immediate contact with the part on which they operate. Thus mercury acts in various local diseases; iodine lessens the growth of many tumors; and turpentine is a diuretic. Turpentine is peculiarly destructive to worms. It enters into every part of the circulation: is recognizable in the urine and in the breath. The turpentine failing, it might be worth while to try the effect of squills, or the gum benzoin, or the balsams of Peru and Tolu. (See page 249.)

Homœopathic treatment.—The medicines to be employed will, in a great measure, be regulated by the different stages of the disease; amongst the most useful, we shall find *bryonia alba, aconite, belladonna, phosphorus, mercurius, cannabis, spongia,* &c. If the inflammation is high, we should commence the treatment by giving *aconite,* particularly when the pulse is high, and the skin hot and dry. *Belladonna,* when there is rattling of mucus, distressing cough, and oppression of the chest. *Bryonia,* with dryness of the mouth and difficult respiration; this remedy is more called for when it is apt to degenerate into pleurisy. *Phosphorus* is particularly indicated when there is reason to apprehend extension of the disease to the substance of the lungs. *Mercurius,* when the symptoms resemble catarrh, with swelling of the glands and an increase of saliva. *Spongia,* when the affection threatens to become chronic. When the breathing is very difficult, *tartarus emeticus* may be given; and if the secretion is abundant, *sepia* will be found useful; also *arsenicum* is a valuable remedy when the disease assumes an epidemic form. It is also useful to administer a few doses of *sulphur* when the animal is to all appearance recovered. If the affection has been allowed to become chronic, the remedies most useful will be found to be *spongia, sulphur, calcarea, carbonica, phosphorus, causticum, silicea, arsenicum, conium, stannum,* &c.

INFLAMMATION OF THE LUNGS.

The beautiful appearance of the *lights,* or lungs, in cattle, will sufficiently prove that these animals are, comparatively, seldom subject to pure inflammation of the lungs. It has been acknowledged, however, that, to a certain extent, it accompanies bronchitis; for, when the membrane of the air-passages is inflamed, it is to be expected that the air-cells in which these passages terminate will not quite escape.

The substance of the lungs is made up of thousands of these little

cells or pouches, into which the air is conducted; and over the delicate membranes constituting the divisions of which myriads of minute vessels are ramifying, and where the blood undergoes its important change. It is easy to imagine that this membrane, so delicate, and so loaded with blood-vessels, must be subject to inflammation of an exceedingly dangerous character.

Still, however, these air-cells are not so often the seat of inflammation in cattle as might on first consideration be imagined. There are exciting causes enough of inflammation in the air-passages from exposure to the inclemency of the weather, and from the general bad management to which cattle are subject; and this may run on to the formation of tubercles and ulcers, and death.

Until lately, all chest affections were confounded under the term pneumonia, or inflammation of the lungs. Pneumonia occasionally attacks all cattle, but more particularly working beasts, and those that have been driven long, or hurried on their journey. The disease usually appears at the distance of some hours, or a day or two, from the exciting cause of it, and can generally be clearly traced to that cause. The beast is dull—the head is extended or drooping—grazing and rumination have ceased. The flanks heave, but not so laboriously as in bronchitis. There is cough frequent—sore, but not so frequent, so urgent, nor so painful as that of bronchitis. The mouth is hot, but the horns and ears and feet are deathy cold. The animal will not lie down—will scarcely move, but more from inability to move because he wants the use of the muscles for other purposes, than from fear of suffocation—and he plainly points out the seat of disease by looking at one or both flanks. Pneumonia, then, would be easily distinguished from the disease which has been just treated of, and from pleurisy, which will next come under consideration, if the symptoms of the maladies of cattle were but a little more attended to than they generally are.

The treatment will vary in some minute particulars. Bleeding will be indicated, and as early as possible, and the blood should flow until the pulse is affected. A much greater quantity will be abstracted in this disease than in bronchitis, because the animal will bear up, or struggle with the loss of blood. In a membrane so vascular as that which lines the air-cells, the inflammation will often be so intense that it will not yield to one bleeding, and the progress of the disease must therefore be watched with this view.

Copious bleeding is the remedy most to be depended on for subduing the inflammation, and should be had recourse to as soon as the disease is discovered. The beast should be put into a cool cow-house, well littered, and immediately bled. If the difficulty of breathing and other symptoms are not much relieved in six or eight hours after the first bleeding, it should be repeated. A third or fourth bleeding may in bad cases be requisite. In this disease, more than

in any other, the person who attends the cattle should be present when the beast is bled. It is impossible, by looking at the patient, and considering the symptoms, to say what quantity of blood ought to be taken away; but, as a general rule, and especially in inflammation of the lungs, and at the first bleeding, the blood should flow until the pulse begins to falter, and the animal seems inclined to faint. The faltering of the pulse will regulate the quantity of the after-bleedings. Little bleedings of two or three quarts, at the commencement of inflammation of the lungs, can never be of service; from six to eight quarts must be taken, or even more, regulated by the circumstances that have been mentioned, and the blood should flow in a large full stream.

Physic will be plainly indicated, and it may be given to cattle in pneumonia, generally with advantage, and always without apprehension. It should, however, be of an unirritating kind. The purgative effect should be first produced by the Epsom salts, and kept up by sulphur. In an acute inflammation, like that of the lungs, it is necessary that the physic should act speedily, and yet it may accumulate in the rumen. The practitioner hardly dare to unite with it aromatic or stimulating matter in order to rouse this comparatively insensible viscus to action, but he must have speedy recourse to the stomach-pump, in the way already pointed out.

Blisters will here be especially indicated. The inflammation is no longer that of the air-passages deep in the substance of the lungs, but of their terminations, upon the surface of the lungs, as well as everywhere else. It is difficult to cause a blister to rise on the thick skin of the ox; yet the common blister-ointment, thoroughly rubbed in, will occasionally have effect. The turpentine tincture of cantharides, repeatedly applied, will cause considerable swelling; or, both of these failing, there remain, in bad cases, boiling water and the hot iron at command. Setons in the dewlap should never be omitted, and should be inserted immediately after the first bleeding, and the purging drink given. Four drachms of nitre, two of extract of belladonna, and one of tartarized antimony, may afterwards be administered twice a day, in a drink.

Attention to diet is requisite, and warm water and mashes must be regularly given two or three times a day.

Homœopathic treatment.—Some doses of *aconitum* at short intervals, (every hour or every two hours,) generally remove the violent fever, after which some doses of *bryonia* (one morning and night,) establish a perfect cure on the second or third day. It is scarcely necessary to say that the beast must be carefully watched for some time, and that it must be protected from damp and cold. Neglected cases of pneumonia have been cured by means of *china* and *nitrum*, after tubercles had probably been formed in the lungs. If the appetite is not soon restored, *nux vomica* and *arsenicum* should be given.

The following medicines will also be found very useful, *tartarus emeticus, sanguinarius canadensis, phosphorus, cannabis, cinchona, rhus toxicodendron,* &c.

ACUTE AND EPIDEMIC PNEUMONIA.

An acute species of pneumonia in cattle is sometimes met with, and it occasionally appears as an epidemic. The beast hangs his head—there is dryness of the muzzle—the mouth and breath are hot—the flanks more or less agitated—there is a hard, dry, and frequent cough—the appetite is gone, but the thirst is excessive—the excrement is solid and black, or liquid, black, and fetid—the coat rough—the horns and ears hot, or alternately hot and cold—there is languor and apparent weakness, and sometimes direct lameness, and most frequently of one of the hind legs.

To these rapidly succeed other symptoms—that tenderness along the spine and the whole of the lumbar region which has been again and again described as so characteristic of almost every inflammatory disease of cattle; the head is now stretched out—the eyes are unnaturally bright, yet weeping—there is grinding of the teeth—the mouth and breath become hotter—a mucous, or sometimes purulent discharge runs from the mouth and nostrils, at first clear, but soon becoming brown, red, or bloody—the flanks heave more violently—the cough is more urgent—it has become convulsive—the nostrils dilate and contract with spasmodic violence—the animal no longer lies down, or if he does, rises again immediately—sweats break out on different parts of the body—the temperature of different parts varies, and very curiously changes—the secretion of milk is suspended, but the teats become hard and swelled—tumors appear on various parts—a shivering, partial or total, succeeds, and the tumors disappear, but they speedily rise again and are more permanent. Possibly some of the most urgent of the symptoms remit when the tumors begin to appear, but towards night an exacerbation succeeds, which does not subside until the morning.

The prostration of strength increases—the belly is tucked up and corded—the flanks heave with greater violence—the back and loins become bowed—the limbs are drawn together towards the centre of gravity—the stools are liquid and fetid, and accompanied by much straining and tenesmus—the sensibility of the loins is now subsided—the sensibility generally is almost gone—the flies collect about the beast, and he makes no effort to drive them away—every irritant ceases to act upon the skin—the respiration is quickened, and more and more laborious—it is accompanied by a gurgling noise in the chest, distinctly heard even without the application of the ear to the side—the nostrils become yet more dilated, and the mucus flowing from them varies in color, but exhales a cadaverous, infectious odor—the breath is now become cold, and is as offensive as the discharge

—the pupil of the eye becomes dilated—an offensive secretion proceeds from the lids, and the animal is evidently becoming blind—the prostration of strength still goes on—the beast falls—he perhaps rises again for a little while—and then falls and dies.

The disease is sometimes rapid in its progress, and the animal is destroyed in twenty-four or eight-and-forty hours after the first attack. This is particularly the case with young cattle, and those that are in good condition. At other times, the beast lingers on six or seven days.

On examination after death, the lungs are gorged and black with blood; they are softened, and easily torn; they, however, contain some spots of hepatization, or condensed substances, and often abscesses filled with pus. In many parts gangrene has begun, and chiefly about the anterior portion of the lung. The pleura, the pericardium, and the diaphragm are black, thickened, and disposed to gangrene. Traces of inflammation are found in the abdomen, but not of so intense a character. The rumen is filled with dry food; the contents of the manyplus are so hardened that they may be broken and reduced to powder; the fourth stomach is more or less inflamed; the liver is enlarged, and of a yellow color, and the bile is thickened.

It is evidently inflammation of the lungs, associated, more or less, with that typhoid form of disease to which cattle are so subject. Solitary cases of it are seen; but it often appears as a kind of epidemic. It used to be called *gangrenous* inflammation of the lungs, from the supposed gangrenous state in which the lungs were found; but these appearances are produced more by congestion, and indicate the violence with which the blood has been driven through the vessels of the air-cells, and by which those vessels have been ruptured, and the cells filled with blood. The blood, once effused, soon coagulates in the cells, and gives that black, softened, pulpy kind of appearance which the cow-leech and the herdsman used to think was proof positive of *rottenness*. It is true that this effused blood soon begins to be decomposed, and the fetid smell of corruption ensues; but this is very different from gangrene of a living part. These congested lungs show that the inflammation was of the intensest character, and had not been long in destroying the animal.

A contagious character of the disease is far from being established. No other variety of pneumonia with which we are acquainted is contagious, at least under ordinary circumstances; yet the farmer should take the most prudent course, and avoid, as much as he can, the possibility of contagion.

Few years pass in which this acute pneumonia does not visit some districts. The symptoms vary, but it is decidedly a disease of the respiratory system primarily, and the danger depends on the intensity of the inflammatory action in the early stage, and the degree in

which, the vital power being exhausted, disease of a typhoid and malignant character succeeds.

Of the nature of the treatment there can be no rational doubt. Although the state of acute fever is quickly succeeded by one of a perfectly contrary character, it is not until it has committed the most earful ravages. The congested state of the lungs—the breaking down of the substance of that important part—must be sufficient to convince any rational person of the mischief that is going forward in the early stage, and the necessity of disarming the enemy before that mischief is irreparably inflicted. Therefore this acute pneumonia should be attacked in time, and by the most energetic treatment. Bleeding is the sheet-anchor, and should be pushed to its full extent. The important fact that the pulse, duly attended to, will prevent the possibility of injurious consequences from bleeding in every case, cannot be too often alluded to. While the pulse keeps up, the power of the constitution, or rather the power of the disease, is unimpaired; and the faltering of pulse gives timely warning that one or the other is preparing to give way. It is folly to object that the after weakness will be increased, or that the bleeding will undermine the power of the constitution; it is the disease which is doing this, and which will fatally accomplish its work if unchecked. By weakening the power of the disease, and especially by its removal, the vigor of the system would be preserved, and the animal would be saved. In proportion to the intensity and rapid progress of the inflammation should be the vigor the attack.

The state of the cough, and heat of the breath, and heaving of the flanks, will indicate, in the space of a few hours, whether the fever is permanently diminished, or has again rallied its forces; and by this the practitioner will be guided as to the propriety of a second bleeding, and the quantity of blood to be taken.

Physic will of course succeed. Two scruples of the farina of the Croton nut should first be given, as most likely to operate speedily; and the Epsom salts and the injection-pump should be in requisition until the bowels are well opened.

This being accomplished, if the inflammation evidently continues, digitalis, emetic tartar, and nitre will be given. If the fever is, to a very considerable degree, subdued, but it is far from certain whether there may not be lurking danger of its return, the sedative medicines must still be given, but half an once of the spirit of nitrous ether should be added. This is an excellent medicine in such cases. It is both a sedative and a tonic. It allays irritation, and it stimulates to healthy action. Its good effect, however, is often destroyed by its being given in enormous doses. In these doubtful cases it will rarely be prudent to give more than half an ounce; and when designed as a stimulant, the dose should rarely or never exceed double that quantity.

If the stage of debility be evidently and rapidly approaching, the chance of doing good is almost gone. Yet there is no cause for absolute despair. The mouth and nostrils and any suppurating tumors must be washed with the chloride of lime. A small quantity —half a drachm—of the powder in solution should be given internally, morning and night. The spirit of nitrous ether and laudanum, in doses not exceeding an ounce of the former with half an ounce of the latter, should be administered; and to them may be added ginger, gentian, and colombo, the whole being given in thick gruel, with half a pint of good ale.

Malt mashes, vetches, carrots, clover, hay—according to the season —may be offered as food, and, should the situation and time of the year permit it, the animal should be turned into a salt-marsh as soon as it has strength to travel there.

The epidemic nature of the malady not admitting of any doubt, and its contagious character being yet a question of dispute, while the healthy beasts are separated from the diseased, the owner cannot too often visit, nor too closely examine his cattle, in order to detect the earliest symptom of the disease, and to attack it while there is fair hope of success.

The sound animals, every one of them, should be bled and physicked. This inflammation is most intense in its character, and strong and healthy beasts in good condition fare the worst; then care should be taken to remove a plethoric state of the system, and thus to remove the predisposition to disease. They should likewise be turned, if possible, into a pasture good and containing sufficient nourishment, but not quite so luxuriant as that on which they had probably been placed.

[Since the first and only edition of this work printed in England, this disease has prevailed fearfully there. It is known as the epizootic and pleura-pneumonia by the veterinarians; and commonly as the lung-epidemic. It is now deemed contagious. It has assumed a still more terrible form, and is always fatal unless promptly treated on its very commencement; not an hour is to be lost.—*Am. Ed.*]

Homœopathic treatment.—Some doses of *aconitum* at short intervals (every hour or every two hours,) generally remove the violent fever, after which some doses of *bryonia* (one morning and night,) establish a perfect cure on the second or third day. It is scarcely necessary to say that the beast must be carefully watched for some time, and that it must be protected from damp and cold. Neglected cases of pneumonia have been cured by means of *china* and *nitrum*, after tubercles had probably been formed in the lungs. If the appetite be not soon restored, *nux vomica* and *arsenicum* should be given.

The following medicines will also be found very useful,—*tartarus emeticus, sanguinarius canadensis, phosphorus, cannabis, cinchona, rhus toxicodendron*, &c.

PLEURISY.

While disease of the substance of the lungs usually takes on the form of bronchitis in cattle, these animals are nevertheless subject to inflammation of the pleura, or covering membrane of the lung, and the lining one of the chest. Of the exciting causes of pneumonia, the most frequent and active, is the exposure to partial cold. The ox, after hard work, and the cow, too soon after parturition, have nothing but the cold, damp ground to lie upon. Even in his stable, the ox is too much neglected; sleeping on dung undergoing fermentation. The evaporation and the diffusion of pestilential gas are in great activity. Nothing can be more likely to cause inflammation of the lining membrane of the chest.

Pleurisy may be produced by contusions on the side, and by wounds penetrating the thoracic cavity: to these evils the ox, among his horned brethren, is much exposed.

Post-mortem examination proves that, next to bronchitis, the most frequent disease of the chest is pleurisy.

Among the symptoms by which we may distinguish pleurisy from every other inflammatory affection of the chest, is the greater frequency of universal shivering, and particularly of shivering or trembling of the shoulders. This is a very peculiar symptom, and should be carefully studied. Even while the animal is otherwise quiet, the shoulders and upper part of the chest are trembling violently.

The cough of pleurisy is lower, shorter, and more painful than that of most other chest affections. The breathing, seldom so laborious as in some other cases, is shorter and broken off in the act of inspiration, and lengthened in that of expiration. The sides are tender; the animal shrinks if they be but lightly touched; and there are twitchings of the skin, and a very curious succession of wavy lines running over the affected side or sides.

The termination of pleurisy is by the effusion of fluid into the chest, compressing the lungs on every side, gradually rendering respiration difficult, and at length impossible, and destroying the beast by suffocation.

There is little difference in the treatment of pneumonia and pleurisy. In both, the inflammation must be subdued by bleeding, physic, sedatives, blisters, setons, and restricted diet. Half an ounce of the common liquid turpentine may be used with advantage, instead of the nitre, when the presence of pleurisy is clearly ascertained.

No advantage has been taken of an operation on the pleuritic ox by which the fluid might be withdrawn from the chest. It may be worth the attempt.

There are generally adhesions between the covering of the lung and the lining of the sides; and between the lung and the diaphragm, which would always interfere materially with the act of respiration

and the health of the animal. In all these cases of chest affection there is so little prospect of saving the beast, that it would be the interest of the owner to have him slaughtered at the beginning, if he be at all in condition, or rather if he be not deplorably thin.

Homœopathic treatment.—The chief remedy to be employed is *aconitum*, of which one dose is to be taken every two, three, or four hours, according to the severity of the fever, until it has entirely ceased. The same doses of *bryonia* are to be given, at intervals of from eight to twelve hours at least, which remove the remainder of the disease. *Chamomilla* contributes to restore the secretion of milk in milch cows.

PHTHISIS, OR CONSUMPTION.

This is only a continuation of the same subject, or, rather, it is a description of another termination of chronic disease of the lungs. One of the consequences of continued inflammation of the lungs is the formation of tubercles. There is a greater or smaller number of little distinct cysts, or cells, into which some fluid is poured in the progress of inflammation. These enlarge, and occupy a space varying from the size of a pin's head to that of a large egg. By degrees the fluid changes to a solid, and the tumor becomes harder than the surrounding substance, and so continues for awhile—the consequence of inflammation, and the source of new irritation and disease.

At length it once more changes. The tubercle begins to soften at its centre, something like suppuration goes on there, and the contents of the swellings become perfectly fluid, but of a different nature from that which first filled the cyst. It is now pus. The cyst increases with greater or less rapidity; it comes in contact with neighboring ones, and the walls of each are absorbed by their mutual pressure. They run together and form one cyst, which is called an abscess, or vomica.

An animal possessing this tuberculated state of the lungs, and the tubercles running into abscesses, is said to be consumptive. So much of the lung is destroyed, that there is not enough left for the purposes of life, and the patient wastes away, and dies.

The lungs of the cow, after chronic or neglected catarrh, or bronchitis, or pneumonia, or pleurisy, are much disposed to assume this tuberculated and ulcerated state. The symptoms of consumption are not always to be distinguished from those of pleurisy, or even pneumonia or bronchitis; and sometimes there may be extensive ulceration of the lungs without any indication of disease sufficient to attract notice. When a bullock is fattened for the butcher, and killed, we occasionally wonder to observe how little of the lung is left for the purpose of breathing.

A cough is the earliest symptom, but a cough of a peculiar char-

acter. That veterinary surgeon is ignorant of his profession, who does not at once, and at a distance, recognize the cough which, although it may not precisely indicate phthisis, betrays a state of the lungs pregnant with danger.

If the cough be sonorous and clear, the lung is not yet fatally injured. That cough, however, must not be neglected long. It is the product of inflammation, that may be silently, but rapidly, disorganizing the lungs. The prudent man will not suffer such a cough to continue many days, without giving a mash, or a dose of physic; or, perchance, bleeding, and inserting a seton. This is one of the points to which we cannot too often recur. It is new practice—new doctrine; the interests of the agriculturist are peculiarly connected with it.

By-and-by, this cough becomes altered. It is no longer loud, and clear, and careless; it is lower in its tone—feeble—hoarse. Mischief has now been done, and perhaps of an irreparable kind. The farmer will not always be able to point out the precise nature of the affection of the chest from the sound of the cough; but he will soon learn to do it much oftener, and much more certainly, than he has hitherto thought it possible. In simple catarrh there is an unchecked effort of the lungs to force on the cough; yet some hoarseness may attend that cough, plainly referable to the upper air-passages. In bronchitis there will also be a forcible effort; the mucus is viscid; and the membrane of the tubes is thickened; and the passage is diminished; and considerable force must be used to urge on a volume of air, and to carry the mucus before it; but it is a force which acts slowly, and by pressure, for the membrane being inflamed is tender. The cough shows pain; it is no longer full and perfect; it is slowly performed, and at the same time husky and wheezing, and the mucus rattles in the passage as it is forced along. In pneumonia the cough is frequent—sore; but it is not so sore as in bronchitis, for it has not the same inflamed membrane to pass over; it is, however, painful, for the substance of the lung is inflamed, and therefore it is low, and, to a certain degree, suppressed. In pleurisy, the cough is sharper, spasmodic, yet not loud. Hitherto the pain has been confined to the lungs; here the lining membrane of the chest is affected, and intense pain felt at every rising and falling of the chest; therefore the cough is short—it is *cut short*—it is somewhat spasmodic, and yet no louder than can be helped.

The cough of incipient consumption is an inward, feeble, painful, hoarse, rattling, gurgling one. It reveals fearful disorganization, which can seldom be repaired. The process of disorganization is not rapid. Weeks and months, or, under favorable circumstances, years, may pass on, and few other symptoms be added to this peculiar cough.

Here is disorganization of the lungs—disorganization which may

in a few cases, be repaired, but in the great majority of them will proceed to its fatal termination. It is a disorganization which does not immediately interfere with the discharge of the functions of life. The beast will fatten, and, perhaps, almost as rapidly as before. In some cases it has been imagined that by careful feeding, a very considerable degree of condition has been acquired with unusual quickness; but this will not last long. The effect of diseased structure, and diminished substance of the lungs, will soon tell in the unthriftiness and loss of condition of the beast. It will not be prudent to attempt any medical treatment at all, or at least beyond that of a mere palliative nature.

If any thing is to be done, bleeding will be here, as in other inflammatory cases, the first step, but pursued in a more cautious manner than in any of the others—never pushed beyond the very first indication of its proper effect, nor repeated until after due consideration, and a full conviction that renewed irritation is beginning to be set up. To this must be added mild doses of physic, and the use of the sedative medicines; with proper care that the animal is not unnecessarily exposed to the vicissitudes of the weather, and yet avoiding too much nursing.

If treatment be tried, there is one circumstance and one only, which will enable one to understand the real ground, and that is, *the character of the cough*, which will still remain, although much less frequent. Is it the clear, sonorous cough which indicates the comparative healthiness of the air-passages, or does it continue to be, to a greater or less degree, painful, inward, feeble, and gurgling? If the latter, the amendment is delusive. It is one of those temporary rallyings of nature, or transient effects of medicine, which are sometimes witnessed; or, perhaps there has been some salutary change of atmospheric influence: but there is mischief still—and the most salutary advice would be, to dispose of the animal while something like its value can be obtained. Weeks, months may pass on; but by-and-by—the symptoms of confirmed phthisis appear, and the animal is lost.

This second, and more violent attack, has many symptoms similar to those that have been described as attending the latter stages of bronchitis or pleurisy; but there are a few which would point out the nature and seat of the disease when there is no previous history of the case to guide the practitioner. The milk gradually diminishes, and, had it been examined before its diminution, an evident deterioration in quality would have been observed; it has acquired an unpleasant flavor—it quickly becomes sour—it spoils, or gives a peculiar taste to that with which it is mixed. The butter that is made from it is ill-flavored, and the cheese will not acquire a proper consistence. Some have said that the milk is of a blue color, and that it has more serum in its composition than ordinary and healthy milk.

When consumption begins to be confirmed, the animal loses flesh with greater or less rapidity, and becomes weak. She eats with almost undiminished appetite; but the process of rumination requiring long, and now fatiguing action of the jaws, is slowly and lazily performed. There is frequently a discharge from the mouth or nostrils, or both; at first colorless and without smell, but soon becoming purulent, bloody, and fetid. Diarrhœa is present, and that to a degree on which the most powerful astringents can make no impression. Then, also, appears the inflammation of the tissue beneath the skin. Whatever part of the animal is pressed upon, she shrinks; and if upon the loins, she moans with pain. The skin becomes dry and scaly; and it strangely creaks as the animal crawls staggering along.

One circumstance is very remarkable and characteristic. The mind and animal desires even of this comparatively dull and insensible being are roused to an extreme degree of intensity. The cow is, in many cases, almost continually in heat. When she is impregnated, the œstrum does not go off; and the consequence of this continuance of excitement is that she is very subject to abortion.

One of the causes of consumption, almost unsuspected by many breeders, and sufficiently guarded against only by a few—hereditary predisposition—cannot be spoken of in too strong terms. It is rare that the offspring of a consumptive cow is not also consumptive. If it be a heifer-calf, she may possibly live a little after her first calving, and then she usually sickens, and the disease proceeds with a rapidity unknown in the mother.

Change of climate is a frequent cause. Some dairymen are aware how much depends on the cow being suited to the climate, or, rather, being in her native climate. This explains the strange difference of opinion with regard to breeds. Almost every farmer is partial to his own breed, and undervalues those of other districts, and even those of his neighbors; and, to a very great degree, he is right. His cattle breathe their native air; they are in a climate to which, by a slow and most beneficial process, and extending through many a generation back, their constitution has been in a manner moulded; and it is only after a long seasoning, and sometimes one attended by no little peril, that the stranger becomes at home in a foreign district, and so adapted and reconciled to the temperature, and degree of dryness or moisture, and to the difference of soil and herbage, as to do quite as well, and yield as much and as good milk, as in the vale in which she was reared.

Experience teaches that a change of climate involving a material difference in temperature, or soil, or herbage, is frequently prejudicial; and that while there is derangement in every system, the respiratory one seems to suffer most, and a slow, insidious, yet fatal change is

there oftenest effected. If a dairy of cows be removed from a moist situation to a dry and colder one, consumption will often appear among them, although a dry air is otherwise esteemed a specific against the complaint; but if they be taken from a dry situation, and put on a woody and damp one, phthisis is sure to appear before the first season is past.

There is one striking fact, showing the injurious effect of heated and empoisoned air on the pulmonary system. There are some cow-houses in which the heat is intense, and the inmates are often in a state of profuse perspiration. The doors and the windows must sometimes be opened, and then the wind blows in cold enough upon those that are close to them, and, one would naturally think, could not fail of being injurious. No such thing. These are the animals who escape; but the others, at the farther end, on whom no wind blows, and where no perspiration is checked, are the first to have hoose, inflammation, and consumption. This fact speaks volumes with regard to the management on many a farm.

In dismissing the diseases of the respiratory system, the author is far more disposed to direct attention to the preventive than the medical treatment. By the former one may do much. Let the over-filled cow-houses be enlarged, and the close and hot ones be better ventilated; let neglect, and exposure, and starvation yield to more judicious and humane treatment; when cattle are fed on dry food, let them have sufficient to drink two or three times every day; let those that exhibit decided symptoms of consumption be removed from the dairy, not because the disease is contagious, but because it is undeniably hereditary; and, where so little can be done in the way of cure, let nothing be omitted in the way of prevention.

Iodine possesses power to arrest the growth of tubercles in the lungs, and even to disperse them when recently formed. It may not be a specific for phthisis or consumption in cattle, but it has saved some that would otherwise have perished, and, for a while, prolonged the existence and somewhat restored the condition of more. Let the proprietor of cattle, and more especially practitioners, study closely the symptoms of phthisis, as detailed, and make themselves masters of the inward, feeble, painful, hoarse, gurgling cough of consumption, and as soon as they are assured that this termination or consequence of catarrh, or pneumonia, or pleurisy, begins to have existence—that tubercles have been formed, and, perhaps, have begun to suppurate—let them have recourse to the iodine, in the form of the hydriodate of potash, given in a small mash, in doses of three grains, morning and evening, at the commencement of the treatment, and gradually increased to six or eight grains. To this should be added proper attention to comfort; yet not too much nursing; and free access to succulent, but not stimulating, food; and the medicine should be continued not only until the general condition of the beast

begins to improve, but until the character of the cough has been essentially changed.

Homœopathic Treatment.—Nitrum, given at the commencement of the disease, which, no doubt, is then difficult of recognition, produces good effects, being employed alternately with *sulphur*. If the phthisis has already become more developed, much good may be obtained from *stannum* and *phosphorus*. *Mercurius vivus* has also been proposed alternately with *hepar sulphuris*. *Colchicum* is useful for the relief of the state of meteorization or formation of gas in the stomach, which often accompanies phthisis.

CHAPTER XII.

THE STRUCTURE AND DISEASES OF THE GULLET AND STOMACHS.

THE ŒSOPHAGUS, OR GULLET.

The food having been forced along the posterior part of the mouth by the consecutive action of the tongue and the muscles of the pharynx, reaches the *œsophagus, or gullet.* This tube extends from the mouth to the stomachs, and conveys the food from the one to the other. In cattle this is true in a double sense; for not only does the food descend from the mouth to one of the stomachs, when it is first gathered, but is returned for a second mastication, and afterwards, a third time, traces the same path to its destination in the true digestive stomach. There is some peculiarity of structure in the œsophagus, in order to prepare it for this increased duty.

We first observe the great thickness and strength of the gullet in the ox. The outer coat of loose cellular substance is yielding and elastic. The second coat is a muscular one, and of great substance and power. Its increased substance enables it to dilate, when the large pellets of rapidly plucked grass, or pieces of parsnip or potato, or other hard roots, enter it; and the same increase of muscular substance enables it to contract more powerfully on such food, and pass it on to the stomach. There are two layers of muscles in the gullet of all our domesticated animals, and the fibres of the outer and inner layer run in different directions, and with plain and manifest reference to the natural food and habits of the animal.

The fibres of both layers of the muscular coat are spiral, but they wind their way round the gullet in contrary directions, admitting thus of the lengthening and shortening of the tube in grazing and swallowing; offering, perhaps not so much pressure on the food, and which the lazy mastication and rumination of the animal does not require; and permitting a great deal more dilitation when some large and hard substance finds its way into the gullet.

The inner coat, a continuation of the membrane of the pharynx, is quite cuticular, smooth, and glistening. It lies in longitudinal plaits, so wide and numerous as sufficiently to dilate when the food passes, and to add very little to the obstacle when a portion of food unusually large is arrested in its passage.

The gullet pursues its course down the neck on the left of the windpipe, until it reaches the chest. It enters with the windpipe and blood-vessels through the opening between the two first ribs, and then winds its way along the upper part, until it reaches the diaphragm, which it pierces, and then soon terminates in a singular canal, which will presently be described.

OBSTRUCTION IN THE GULLET.

This is commonly called *choking*. When a beast is first put on carrots, or parsnips, or potatoes, or turnips, he is very apt to be choked. The first mastication is always a very careless affair, and everything that is put before the animal is swallowed with very little chewing. If the herdsman has not been attentive in slicing or bruising the roots, mischief of this kind is likely to happen. It happens often when eggs, to promote condition in cattle, are given whole, or loaded with tar, or some nauseous drug, in cases of blain, hoose, mawsick, or other supposed stomach complaints.

When the root sticks in the gullet, and can be evidently seen and felt there, the farmer or the cowherd first gets his cart-whip—in good hands not a dangerous instrument, on account of its being pliable and yielding; others take a cart-rope, which is somewhat more objectionable, because the ends may do mischief. They who have neither good sense nor regard for the sufferings they may inflict, take even a common rack-stick. Whatever it be, they thrust it down the gullet and work away might and main, to drive the offending body down.

There is no doubt that some instrument should be introduced into the gullet, in order to push the root into the stomach, but it is the force that is used to which we object, and that does all the mischief.

DESCRIPTION OF THE ŒSOPHAGUS PROBANG.

Every farmer should have a flexible probang ready for use, either of the improved kind, as contrived by Mr. Read, or on the plan of that which was first introduced by Dr. Monro.

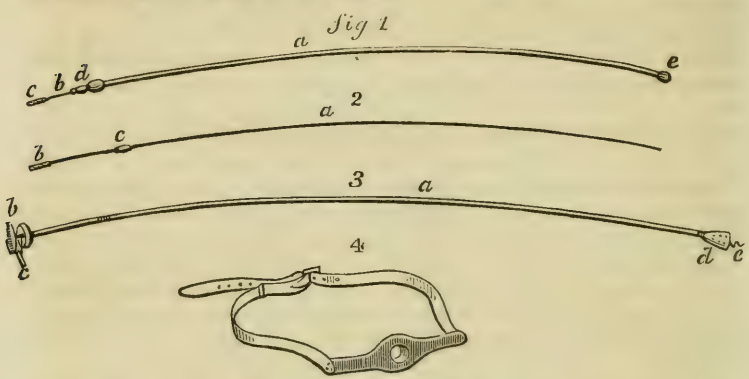
The cut on p. 280 will give a sufficient idea of the construction of the most useful probang, or œsophagus-tube.

Fig. 1. *a*. The tube, made either of simple leather, or of leather covering a canal formed of spiral wire. It is about four feet and a half in length, so as to reach from the mouth to the rumen, and leaving a sufficient portion outside the mouth for it to be firmly grasped.

b. The stilett, represented as introduced into the tube, and running the whole length of it. It gives greater firmness and strength to the tube, when it is either passed into the stomach in cases of hoove, or used to force anything down the gullet.

c. The handle of the stilett.

d. A hollow piece of wood running freely upon the stilett, and placed between the handle of the stilett and the round extremity of the tube. The stilett is longer than the tube by the extent of this piece of wood, but is prevented from protruding beyond the bulb of the tube at the other end, by the interposition of this slider at the handle. The stilett may be introduced at either end of the tube. It is usually inserted at *e*, when the instrument is used to force any obstructing body down the throat, because the enlarged and bulbous termination of the tube at the other end has a flat or rather concave surface, and can therefore act with more effect and power on the substance which sticks in the throat.



e. The end of the tube which is introduced into the paunch in cases of hoove. Its rounded extremity will permit it to be more easily forced through the roof of the paunch, and it is perforated with holes for the escape of the gas with which the paunch may be distended.

Fig. 2 represents the whalebone stilett, with the hollow piece of wood running upon it, and shows how easily it may be withdrawn from the stilett when that is taken out of the tube. The running piece of wood being withdrawn, if the handle of the stilett be then pushed down on the bulb of the tube, a portion of it will project at the other end; and by moving the stilett up and down in the tube, this may be made to act on the obstructing body, in the manner and with somewhat of the force of a hammer.

Fig. 3 will be presently described.

Fig. 4 is a piece of thick strong wood, widest at the centre, and there perforated. It is introduced into the mouth in order to keep it open during the use of the probang, which is inserted through the hole in the centre. Leathern straps are nailed to the extremities: these are buckled round the horns, and by means of them this mouth-piece is securely fastened; while one of the extremities, being grasped

by the operator, forms a very useful point of support during the use of the tube. The farmer should also have another *mouth-piece*, with a central hole that will admit of the passage of a small hand. He will thus be enabled to get at and to remove substances that have not descended beyond the commencement of the gullet, or that have been returned so far by means to be hereafter described. This mouth-piece will be very useful in cases of polypus in the nose and many diseases of the pharynx; but it would be too large to be long continued in the mouth without great pain to the animal, nor could the probang be so securely or effectually worked through so extensive an aperture. It is high time that those rude, dangerous, and ineffectual instruments—the cart-whip, and the cart-rope, and the rack-stick—should be banished from the practice of the veterinary surgeon, and discarded by the farmer too.

MODE OF OPERATING FOR THE REMOVAL OF SUBSTANCES OBSTRUCTING THE GULLET.

If a cow has swallowed a potato, or turnip, too large to descend the gullet, and which is arrested in its progress, and evidently seen at a certain distance down the throat, the farmer should have immediate recourse to the œsophagus-tube, introducing the flatter end into the throat, and using moderate force. If the obstructing body yield to this, he will be justified in pushing it on within the chest; but if, with the application of a fair degree of force, it is very slowly and with difficulty pushed on, the operator should instantly relinquish the determination to drive it down, for the fibres of the muscular coat of the gullet soon become irritated by the continued distension, and contract powerfully, and, as it were, spasmodically, upon the foreign body, and imprison it there. It should also be remembered that the gullet itself becomes smaller as soon as it has entered the thorax; and, consequently, that which can be moved only with difficulty in the upper part of the neck, will not be moved at all in the lower portion of it.

The next consideration then is, whether, although the obstructing body cannot be driven on, it may not be solicited, or forced backward. The fibres of the upper part of the gullet have already yielded, and suffered this substance to pass them—they are somewhat weakened by the unnatural distension—they have not yet had time to recover their tone, and they may yield again. It is at least worth the trial.

The internal coat of the œsophagus is naturally smooth and glistening; it may, however, be made more so, and the surface of the obstructing body may be polished too. A half-pint of olive oil should be poured down the throat, and an attempt then made with the fingers, applied externally, to give the body a retrograde motion. By patient manipulation this will be effected much oftener than is

imagined. The intruding substance will be dislodged from the situation in which it was impacted, and will be brought to the upper part of the œsophagus, or even into the pharynx, and will then be sometimes got rid of by the efforts of the beast itself, or may be easily drawn out by means of a hand introduced through the large mouth-piece to which reference was made in the explanation of the œsophagus-tube.

If the obstructing body cannot be moved in this way, we are not yet without resource. Mr. Read has made an important improvement on, or addition to, the œsophagus-tube, in the form of a corkscrew. Vide fig. 3, in the preceding cut.

a. The leather tube, as before, but somewhat larger, and longer, and stronger; and the upper part of it, for the purpose of additional strength, composed of brass.

b. The handle of the stilett, which runs through it, as through the other tube.

c. One of two pieces of wood placed between the handle and the tube; hollowed so as to fit the stilett; removable in a moment, and, like the hollow piece of wood in the other tube, permitting the stilett to be two or three inches longer than the tube. They are here removed, and one of them hangs down, suspended by a string.

d. The bulb which is introduced through the mouth-piece, and forced down the gullet. It is considerably larger than those at the ends of the other tube, but not so large as the distended gullet.

e. A corkscrew fixed to the end of the stilett, and which, coming out in the centre of the knob, cannot possibly wound the gullet.

When this instrument is used, the stilett is pulled up so that the screw is perfectly retracted and concealed within the knob. The pieces of wood, *c*, are placed upon the stilett, between the handle and the top of the tube, and tied there, so that the screw is now fixed within the knob; and the instrument is introduced through the mouth-piece, and forced down the throat until it reaches the obstruction. The pieces of wood are then untied, and, by turning the handle, the screw is worked into the obstructing body, as the common corkscrew is into a cork in the neck of a bottle. If the potato or turnip be fresh and sound, it would hardly be credited what purchase is obtained, and in how many instances the nuisance may be drawn up the throat and got rid of. If the centre of the root should give way, and a portion of it only be brought out, there is still some good done, and the screw should be returned again and again, until it will no longer take hold. By this time, probably, the root will have been so weakened and broken down that it will yield to the pressure of the first probang, and be forced along into the rumen; or at least it will be so weakened, that the stilett of the first tube may be used with advantage.

The stilett must be withdran from the tube, and the running piece

of wood taken away; the stilett is then returned to its sheath, and may be made to project a couple of inches beyond the knob. It is retracted, and the tube is passed into the throat; when it will be evident that the operator may use either the comparatively broad part of the knob, or the small and sharp stilett, as the case may seem to require. To the first he can only apply simple pressure—to the stilett he can give a percussive action. By sharply pushing down the handle of the stilett, he will make the other end act with the power of a little hammer, and thus may break down, and probably work through, the centre of the root, as in the case which has been just related. A perforation having been made through the centre, and the obstruction having been previously torn and weakened by the screw, the whole may gradually be broken down, or will more readily yield to pressure.

These directions have been founded on the supposition that the foreign body is lodged in the gullet above the entrance into the thorax; and if the operator fails in all these contrivances, perhaps he will now admit, although reluctantly, the application of external force. It has been recommended to place a small piece of wood against the gullet, and in contact with that portion of the skin which covers the obstructing body, and then, with a wooden mallet, to hammer away against the opposite side. The root has been thus occasionally broken down, and then forced on with the cart-whip; but more frequently the beast has been sadly punished, without any good effect having been produced; and, in some instances, although the nuisance was for a while got rid of, so much tenderness of the gullet remained, and inflammation arose, and ran to such an extent, that the animal did not regain its appetite for many weeks afterwards, or pined away, and became comparatively worthless. The practitioner will, therefore, unwillingly have recourse to this, and will be justified in first seeing what bleeding will do. There is not a more powerful relaxant than bleeding—and especially when it is carried on, if necessary, to absolute fainting. For awhile every spasmodic action ceases, and every muscular fibre loses its power to contract. The operator will, probably, take advantage of the momentary relaxation, in order to force the body either upward or downward—upward first, and by far in preference; or if downward, yet still cautiously balancing in his mind the degree of resistance with the chance of ultimate success; for, if the resistance continues to be considerable, he may depend upon it that when he has arrived at the thorax, all further efforts will be fruitless, and the patient will be lost.

He has one last resource, and he needs not to be so afraid of venturing upon it. There is the operation of *œsophagotomy*, or the cutting down upon the obstruction, and thus removing it. The veterinary surgeon will never find, or ought never to find, difficulty here. After having passed a little way down the neck, the œsophagus is

found on the left of the trachea, and between the carotid and the jugular. The artery will be detected by its pulsation, and the vein by its turgescence. The only muscle that can be in danger is the sterno-maxillaris, and that may, in a very great majority of cases, be avoided, or, if it be wounded, no great mischief will ensue.

The animal should be cast, (at least this is the safest way, as it regards both the operator and the patient.) It should be thrown on the right side, and the head should be a little stretched out, but lying as flat as the horns will permit. The place of obstruction will be seen at once. An incision is by some persons made immediately into the gullet, sufficiently long for the extraction of the root. The safer way, however, is for the cellular substance to be a little dissected away before the gullet is opened, when, if the incision be long enough, the incarcerated body will readily escape. The edges of the œsophagus should then be brought together, and confined by two or three stitches; the skin should also have the same number passed through it, the ends of the stitches of the gullet having been brought through the external wound. The beast should have nothing but gruel for two or three days; and, after that, gruel and mashes for a little while longer. In a fortnight or three weeks the wound will generally be healed, and scarcely a trace of the incision will be visible.

If the obstruction be not observed, or the practitioner not called in until the potato or parsnip has passed into that portion of the gullet which is within the thorax, the chances of saving the animal are materially diminished. The common probang should first be tried, and, that failing, the corkscrew should be resorted to, either to draw the body out, or so to pierce it and break it down, that it may be forced onward either by the stilett or the knob. The practitioner should, if necessary, use all the force he can; for, if the obstruction be not overcome, the animal will assuredly perish.

It has often been observed, and with much truth, that cows, in whose gullet this obstruction has once taken place, are subject to it afterwards. Either they had a habit of voracious feeding, or the muscles are weakened by this spasmodic action, and not able to contract upon the food with sufficient force for the ordinary purposes of deglutition. It will therefore generally be prudent to part with the cow that has once suffered from an accident of this kind.

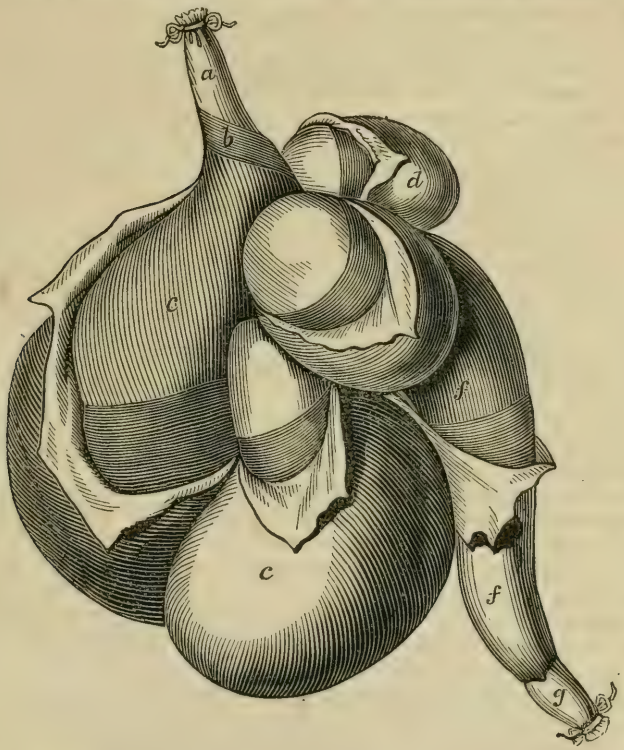
STRICTURE OF THE ŒSOPHAGUS.

This rarely occurs in cattle. The writer of this treatise has met with only one marked case of it. The food occasionally accumulated in the upper part of the gullet until there was a swelling eight or ten inches in length, terminating in an evident contraction of the œsophagus. He passed a probang through the stricture, as large as, without too great violence, he could manage, and confined it there for an hour,

by means of tapes. This was done for a few days, when a larger probang was used. The food accumulated less frequently, and, soon after, ceased to accumulate at all.

RUPTURE OF THE ŒSOPHAGUS.

In cases of laceration, or rupture of the gullet, which too frequently follow the violent attempts of unskillful persons to force down the obstructing body, something might be done if the mischief were immediately ascertained. Prudence, however, would dictate the sacrifice of the animal, while it could be fairly sold to the butcher.



If the cure be undertaken, the part must be opened—the foreign body liberated from the cellular texture into which it had probably been driven—all the dirt and indigested matter cleared carefully away—the ragged and lacerated edges cut off—the divided portions

brought as neatly and as closely together as possible—and the whole secured by bandages passed several times round the neck; while the animal is allowed gruel only for many days, and then mashes. The dressing should be the healing ointment, daily applied. The power of nature is great; and, the foreign body having been removed before it could cause inflammation and mortification by its presence, the parts may be reinstated to every useful purpose.

THE ŒSOPHAGUS WITHIN THE THORAX.

As the œsophagus approaches the chest, it takes a direction more and more toward the left, and enters it on that side of the windpipe. It is there found between the laminæ of the mediastinum, following the direction of the dorsal vertebræ. It passes by the base of the heart, leaving the venæ cavæ on the right, and the aorta on the left. It by degrees separates itself from the spine, penetrating between the lungs, and, pursuing its course toward the diaphragm, passes through the great opening between the crura of that muscle. As it travels through the mediastinum and between the lungs, it diminishes in size, and acquires considerable firmness of texture; but it has no sooner entered the abdomen, and begun to dip downward, than it becomes more muscular, and less firm in its structure. It also rapidly increases in size until it assumes almost the shape of a funnel; and terminates directly in no particular stomach, but in a canal which opens into all the stomachs, of which, as will be seen, the ruminant possesses four.

Recourse must be had to a few cuts, in order to render this intelligible to the reader.

The cut in the preceding page will exhibit the form of the stomachs when filled, their relative situations, and their connection with each other.

a. The œsophagus gradually enlarging as it descends, and apparently running into the rumen or paunch, but, in fact, terminating in a canal.

b. A continuation of the spiral muscles of the œsophagus, thicker and more powerful as they approach the termination of that tube.

Before proceeding to the consideration of the other parts delineated in that cut, let us take a different view of the structure and termination of the gullet. (See cut on page 288.)

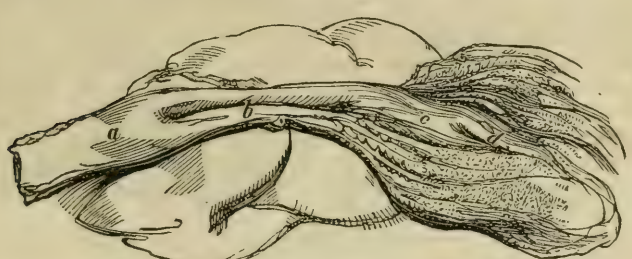
a. The œsophagus, enlarging as it descends, and becoming more muscular, and particularly the upper and posterior part of it. The continuation of it along the stomachs is slit up, in order to show that it would form the continuous roof of the canal which is here laid open, and which leads to the third and fourth stomachs.

b. The *œsophagean canal*, exposed by slitting the roof from the termination of the gullet to the third stomach. A considerable part of the floor is composed of two muscular pillars, lying close to each

other. It would therefore appear, at first inspection, to be a perfect canal, and that what descended into it from the gullet would run on to the third and fourth stomachs. These pillars are duplicatures of the roof of the first and second stomachs, which lie immediately underneath them.

c is the continuation of the same canal into and through the manyplus, or third stomach, which is known by its leaves and thin hooked edges.

d is a prolongation of the same canal into the fourth, or true digestive stomach. It is easy therefore to perceive that the food, whether solid or fluid, may, at the will of the animal, or under particular circumstances of the constitution, pass into the third and fourth stomachs, without a particle of it entering into the first or second; and we know that this is the case with the food after it has undergone the process of rumination, or a second mastication.



The following cut will give another view of the same parts.

a is again the œsophagus, terminating in the œsophagean canal.

b is, as before, the œsophagean canal; but now, at the will of the animal, or under certain states of the constitution, these pillars are no longer in contact with each other, but there is a large opening at the bottom of the œsophagus, displaying the two first stomachs lying under them.

c is the *rumen*, or *paunch*, or first stomach, placed immediately under the termination of the gullet, and substances descending that tube fall through this opening, and are received into it. All the food, when first swallowed, goes there, to be preserved for the act of rumination; and a portion, and occasionally the greatest portion, of the fluids that pass down the gullet, enters the rumen. Farther on, at

d, is the *reticulum*, or second stomach. From the state of that stomach, or at the will of the animal, the muscular pillars here also relax, seldom or never to permit that which is passing along the œsophagean canal to enter the reticulum, but that the contents of the reticulum may be thrown into the œsophagean canal. This is

the case when the pellet of food is returned for remastication—it is thrown into the canal from the reticulum—it is seized by the powerful muscles at the base of the gullet, and carried up by the spiral muscles of that tube in order to be remasticated. It will be seen the upper pillar (situated towards the right in the living subject), and the lower part of the opening made by the relaxation of the pillars, belong to the reticulum; the lower pillar and the anterior portion of the opening (situated towards the left) belong to the roof of the rumen. This is very satisfactorily seen in the dried stomach of a young calf.

e is the manyplus, or third stomach, and through which the canal is still to be traced to

b, the abomasum, or fourth, or true digesting stomach. So that, as was asserted, this canal leads to no particular stomach exclusively, but to all of them according to circumstances.

We are now, perhaps, prepared to return to the consideration of the first cut (p. 285).

c c represent the form of this stomach in the greater part of ruminants, and particularly in oxen and sheep. It is situated somewhat obliquely in the abdominal cavity, and occupies nearly three-fourths of it. It is divided into two unequal compartments, or sacs, and reaches from the diaphragm to the pelvic cavity. By its superior surface it is attached to the sublumbar region by its vessels, nerves, and a portion of mesentery. On the right side it is covered by a portion of the intestines; on the left side it is more elevated, and is in contact with the left flank. It is on this account that we are sometimes induced to adopt the unsurgical mode of giving relief in cases of hoove; for when we plunge our lancet or knife into the

left flank, we puncture the distended stomach. Its inferior surface rests upon the floor of the belly. The left side reaches to the diaphragm, and thence, under the left flank, to the pelvis. The right side rests on the floor of the abdomen, and is covered by the fourth stomach. The anterior extremity is attached to the diaphragm by the œsophagus, and by the cardiac ligament; and the right extremity floats free, generally occupying the pelvis, but pushed thence in the latter period of gestation.

Deep scissures not only divide it into two lobes, as has been mentioned, but another scissure posteriorly, which will be shown in the next cut, forms it into two others; so that its interior presents four compartments, separated from each by deeply projecting duplicatures of the walls of the stomach.

This cut represents two of the three coats of the rumen.

The external, or *peritoneal*, coat is here represented as turned back at different places, in order to show the muscular coat, which consists of two layers, the one running longitudinally and the other transversely; yet not accurately so, for they appear to run obliquely, and in many different directions, according to the varying curvatures of the stomach. A very erroneous opinion of this great macerating stomach would be formed by considering it as a mere passive reservoir in which the food is contained until it is wanted for rumination: it is in constant motion; the food is perpetually revolving through its different compartments, and undergoing important preparation for future digestion. These muscles are the mechanical agents by which this is effected, and by running in these different directions they are enabled to act upon all the differently formed cells of this enormous viscus.

d. The *reticulum*, or *honey-comb*, or second stomach, viewed externally, and supposed to be filled. It is a little curved upon itself from below upward, and is the smallest of all the stomachs. It rests against the diaphragm in front of the left sac of the rumen, and is placed under the œsophagus, and upon the abdominal prolongation of the sternum. There are two layers of muscles belonging to this stomach, one of them running longitudinally and the other transversely, as in the rumen.

e gives the external appearance of the *manyplus*, or third stomach. It is less rounded, and longer than the reticulum. It is curved upon itself from above downward. Its little curvature is applied on the left, partly over the reticulum, and more on the paunch; and on the right it is placed over the base of the fourth stomach. It is situated obliquely from the right side of the abdomen, between the liver and the right sac of the rumen. Girard thus describes it:—"Its anterior face rests against the liver and the diaphragm—its posterior is placed over the right sac of the rumen. Its great, rounded, convex curvature is attached to the fourth

stomach, and also to the rumen, by a prolongation of mesentery; and its little curvature is continuous with that of the reticulum."

Figs. 1 and 2 represent the two layers of muscles, as before.

f. The *abomasum,* or fourth stomach, is elongated, and of a cone-like form, yet somewhat bent into an arch, situated obliquely to the right of and behind the manyplus, and between the diaphragm and the right sac of the rumen. It has two free or unattached faces, one against the diaphragm and the other against the right sac of the rumen—two curvatures, the inferior and larger convex, and giving attachment along its inner border to a portion of mesentery, which extends to the inferior scissures of the rumen; and the superior or smaller, receiving the portions of mesentery which go from the reticulum to the superior scissures of the rumen. It is also said to have two extremities, the one anterior, which is the larger, and placed inferiorly, adhering to the smaller curvature of the manyplus, and constituting the base, or great extremity of the abomasum; and the posterior and superior, which is narrow, elongated, curved above and backward on the superior face of the right sac of the rumen, and called the smaller or pyloric extremity.

A dissection of the muscular coat is given here, as in the other stomachs.

g represents the commencement of the *duodenum,* or first intestine.

The reader is now prepared for the consideration of the interior of these stomachs.

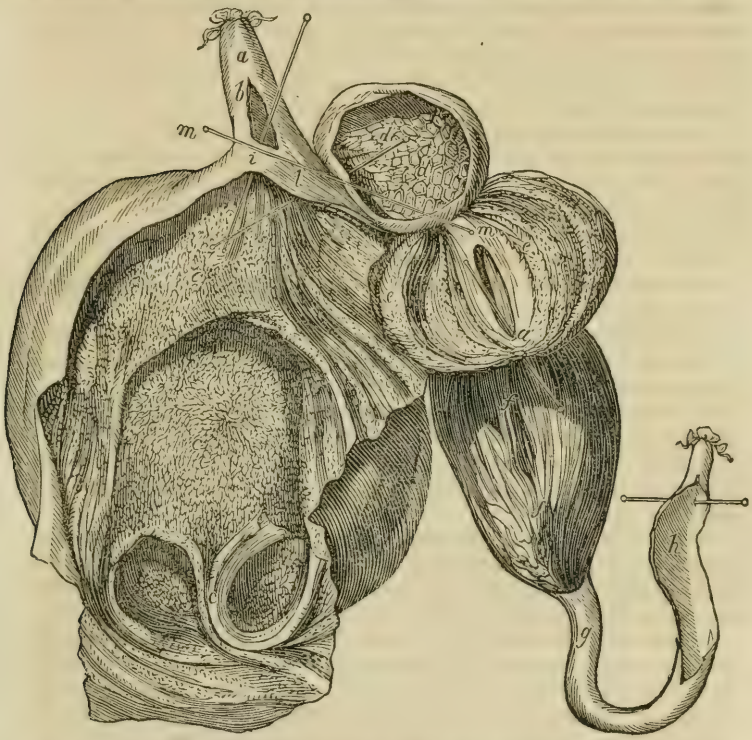
a. The *œsophagus,* as before, enlarging, and assuming a funnel-like shape as it approaches the stomachs.

b. The *œsophagus,* cut open at the commencement of the *œsophagean canal,* in order to show its communication with the first and second stomachs.

c. The rumen, laid open and divided into its different compartments by scissures, more or less deep, and which on the internal surface appear as indentations, or duplicatures of the coats of the stomach. They are recognized under the name of the double-tripe when prepared for the table. The rumen is divided into two large sacs, seen in the cut of the external form of the stomachs (p. 285,) and the walls that separate them are thick, and perpendicular to the surface of the stomach, so as to form a very considerable separation between the compartments of the stomach. These again are subdivided by transversal bands, which form smaller compartments. Two, belonging to the posterior portion of the stomach, are given in this cut. There are similar divisions in the anterior sac, but which are here concealed by one of the folds of the stomach.

The whole of the rumen is covered by a cuticular membrane, constituting the third or inner coat. Immediately under this, and arising from the interposed tissue between the muscular and cuticular coats, there are innumerable small prominences or papillæ. They are of

different sizes and forms in different parts of the rumen. Toward the longitudinal bands or duplicatures they are small, and thinly set; they are more numerous and larger toward the centre of the compartments; and largest of all in the bottom of the posterior and most capacious sac. In every part of the rumen they are more thickly set, and broad and strong toward the centre or bottom of each compartment. They are also harder and blacker in these places. When regarded in different compartments, they appear to be bent or inclined



in different directions; but when they are more closely examined, they are all inclined in the direction which the food takes in its passage through the various divisions of the rumen. They are evidently erectile, and may sometimes bristle up and oppose the passage of the food; while at other times they yield and bend, and suffer it to pass with little or no obstruction. Some have imagined that these are glandular bodies, and that they secrete a peculiar fluid; others confine the glandular apparatus to the tissue between the cuticular coat;

and numerous little prominences, which can be seen in the inflated stomach of a young ruminant when exposed to the light, are best accounted for by considering them as glandular bodies.

There are two openings into the rumen; the one already spoken of, at the base of the œsophagus, and through which the substances gathered at the first cropping of the food, and perhaps all solids, fall, and a considerable proportion of the liquids are swallowed. The other opening is below this. It is larger and always open; it communicates with the second stomach; but there is a semilunar fold of the rumen, that runs obliquely across it, and acts as a valve, so that nothing can pass from the first into the second stomach, except by some forcible effort; and it is very seldom that anything is returned from the rumen directly into the œsophagus.

Considering the size of the paunch, it has very few blood-vessels; in fact, it has not much to do except macerating the food. The arteries are supplied by the splenics, which are of very great size in ruminants. The nerves are given out by the cœliac plexus.

d. The *reticulum*, or second stomach. The cuticular coat here covers a very irregular surface, consisting of cells, shallower and wider than those of a honey-comb, but very much resembling them; hence this stomach is sometimes called the *honey-comb*. Each of these divisions contains several smaller ones; and at the base and along the sides of each are found numerous minute prominences, or papillæ, which are evidently secreting glands.

There are two openings into the stomach; one through the floor of the œsophagean canal, one of the pillars of which is formed of a duplicature of the coats of the lesser curvature of the reticulum. The other is that already described, between this stomach and the rumen.

The muscular coat of this stomach is thick and powerful, but the blood-vessels are not numerous, for it will hereafter appear that its functions are very simple. The arteries and nerves of the reticulum are derived from the same source as those of the rumen.

e. The *manyplus*, or third stomach. The internal structure of this stomach is very singular. The œsophagean canal changes its form and character at the commencement of the manyplus; and the fleshy pillars, of which mention has been so often made, unite, forming a kind of obtuse angle. The floor of the canal is now perfect, and nothing can any longer fall into the stomachs beneath. A small circular aperture alone is left between them, which conducts to the third stomach, the floor of which is closed, but the roof is constructed in a remarkable way. The whole of the stomach contributes to form this roof; and from it there descend numerous duplicatures of the cuticular coat, each duplicature containing within it cellular tissue, blood-vessels, and a thin but powerful layer of muscles. They are formed into groups. A long duplicature, resembling a leaf or cur-

tain, hangs from the roof, and floats free in the stomach, and reaches nearly down to the floor. On either side of it is a shorter leaf, and beyond that a shorter still, until the outer leaf becomes very narrow. Then commences another group, with a long leaf in the centre, and others progressively shortening on each side, until the stomach is filled with these leaves, hanging down from every part of it, floating loosely about, and the lower edge of the longest of them reaching into the continuation of the œsophagean canal.

The cuticular covering of these leaves is peculiarly dense and strong, and thickly studded with little prominences; so that when the leaf is examined it exhibits a file-like hardness, that would scarcely be thought possible; and it is evidently capable of acting like a file, or little grindstone. These prominences are larger and harder toward the lower part of the leaf; and, in the central leaves, assume the form and office of little crotchets, or hooks, some of which have the hardness of horn, so that nothing solid or fibrous can escape them.

These groups of leaves vary in number in different animals, and the number of leaves constituting each group vary too. They float thickest, and the canal is smallest, at the entrance into this stomach, where they are most wanted. Toward the fourth stomach the course is left more open.

As would be expected, from the complicated mechanism of this stomach, it is more abundantly supplied with blood-vessels and with nerves than the second, or even than the first, although that is many times larger than the third.

f. The *abomasum*, or fourth stomach, is lined by a soft villous membrane, like the digestive portion of ordinary stomachs. It also contains a great number of folds, or leaves, somewhat irregularly placed, but running chiefly longitudinally. They are largest and most numerous at the upper and wider part of the stomach; and one of the folds, in particular, is placed at the entrance into the abomasum, yielding to the substances which pass from the third stomach into the fourth, and leaving, as it were, a free and open way, but opposing an almost perfect valvular obstruction to their return. This explains the reason why vomiting is so rare in the ruminant; and that when it does occur, it must be produced by such violent spasmodic efforts as to cause or indicate the approach of death. See *g* and *h*. p. 288.

Toward the lower and narrower part of the stomach these folds are less numerous and of smaller size: they are also more irregular in the course which they take; some of them running obliquely and even transversely. This coat of the stomach, when the animal is in health, is thickly covered with mucus, while, from innumerable glands, it secretes the gastric juice, or true digestive fluid.

The pyloric or lower orifice of this stomach is guarded by a rounded projecting thick substance, by which the entrance into the intestine

is much contracted, and which, indeed, partly discharges the function of a sphincter muscle.

g is a portion of the *duodenum*, or first intestine.

h. The place where the *biliary* and *pancreatic ducts* enter the duodenum.

i. A stilett is here supposed to be passed through that portion of the œsophagean canal (the very beginning of it) through which the gullet communicates with the paunch.

k. A stilett is here supposed to run through that part of the canal by means of which the gullet communicates with the second stomach.

l. A stilett here passes below the last, and under the œsophagean canal, showing the situation of the direct communication between the rumen and the reticulum.

m. The supposed direction of the œsophagean canal to the third stomach, over the roofs of the paunch and the second stomach.

n. Its passage through the third stomach, and entrance into the fourth.

THE CHANGES OF THE FOOD IN THE DIFFERENT STOMACHS.

The ox rapidly and somewhat greedily crops the herbage, which undergoes little or no mastication, but being rolled into a pellet, and as it passes along the pharynx being somewhat enveloped by the mucus there secreted, is swallowed. The pellet, being hard and rapidly driven along by the action of the muscles of the œsophagus, falls upon the anterior portion of the œsophagean canal, and its curiously formed floor; and either by the force with which it strikes on these pillars, or by some instinctive influence, they are separated, and the pellet falls into the rumen, which is found immediately under the base of the gullet, as represented at *c*, p. 288, and *i*, p. 291. The food, however, which thus enters the rumen does not remain stationary in the place where it falls. It has been seen that the walls of this stomach are supplied with muscles of considerable power, and which run longitudinally and transversely, and in various directions all over it, and by means of them the contents of the paunch are gradually conveyed through all its compartments. At first the food travels with comparative rapidity, for the muscles of the stomach act strongly, and the papillæ with which it is lined easily yield and suffer it to pass on; but, the rumen being filled, or the animal ceasing to graze, the progress of the food is retarded. The muscles act with less power, and the contents of the stomach with greater difficulty find their way over the partitions of the different sacs, and, at the same time, probably, the papillæ exert their erectile power, and oppose a new obstacle.

If a considerable opening be cut into the flank, immediately over the

paunch, a swinging or balancing motion of that stomach, both upward and downward and forward and backward, may be plainly seen.

The uses of the papillæ seem to be various; they support the weight of the superincumbent food, unmasticated, and liable to injure the coat of the stomach, over which it is constantly moving; they take away from the follicular glands of the stomach that pressure which would render it impossible for those glands to discharge that mucous lubricating fluid which is requisite for the protection of the stomach and the revolution of the food. The papillæ are consequently more numerous and larger and stronger at the centre or bottom of each of the compartments where the food would accumulate and press most; and they are more thinly scattered, and in some places almost disappear, where there is no danger from the pressure of the fraction. In addition to all these, are the important functions of yielding and suffering the food to pass unimpeded along, while the stomach is rapidly filling as the animal grazes, and then by their erectile power retarding that progress when the beast has ceased to eat, and the slow process of rumination has commenced. The glandular bodies, to which allusion has been made, are most plentifully situated, and are of largest size, on the upper part of the sides of the rumen, where they are least exposed to pressure, and may discharge the lubricating mucus which they secrete, without obstacle.

The only change that takes place in the food in a healthy state and action of this stomach is that of maceration, and preparation for the second mastication, as may be easily proved by taking from the mouth of a cow a pellet that has been returned for rumination, and which will be found to be merely the grass, or other food, so otherwise altered than being softened, and covered with a portion of mucus. The fluid which the rumen contains is not secreted there, but whenever the animal drinks, a portion of the water breaks through the pillars of the œsophageus canal, regulated in quantity either by the will of the beast or by the sympathy of the parts with the state and wants of the stomach, or with the state of the constitution generally. The rumen of a healthy ox always contains a considerable quantity of fluid.

The food, having traversed all the compartments of this stomach, would arrive again at the point from which it started, were it not that a fold of the rumen arrests its course, and gives it a somewhat different direction. This fold is placed at the spot where there exists a communication between the rumen and the reticulum, and which, also is guarded by a fold or valve; but the peristaltic motion of the stomach going on, and the food pressing from behind, a portion of it is at length, by a convulsive action, partly voluntary and partly involuntary, thrown over this fold into the reticulum.

The inner coat of the reticulum, or second stomach, has been

described as divided into numerous honeycomb-formed cells (they are well represented at *d*, p. 291,) at the base of each of which are numerous small secretory glands, which also furnish a considerable quantity of mucus. The action of this stomach consists in first contracting upon its contents; and, in doing this, it forms the portion just received from the rumen into the proper shape for its return up the œsophagus, and covers it more completely with mucus; then, by a stronger and somewhat spasmodic action, it forces the pellet between the pillars at the floor of the œsophagean canal, where it is seized by the muscles, that are so powerful at the base of the œsophagus, and which extend over this part of the canal, and is conveyed to the mouth. The reticulum, expanding again, receives a new portion of food from the rumen, and which had been forced over the valve by the convulsive action of that viscus.

It is curious to observe the manner in which these acts are performed. The cow, if lying, is generally found on her right side, in order that the intestines, which are principally lodged on that side, may not press upon and interfere with the action of the rumen. After a pellet that has undergone the process of rumination is swallowed, there is a pause of two or three seconds, during which the cow is making a slow and deep inspiration. By means of this the lungs are inflated and press on the diaphragm; and the diaphragm in its turn presses on both the rumen and the reticulum, and assists their action. Suddenly the inspiration is cut short by an evident spasm; it is the forcible ejection of the pellet from the reticulum, and of a fresh quantity of food over the valvular fold, to enter the reticulum as soon as it expands again. This spasmodic action is immediately followed by the evident passage of the ball up the œsophagus to the mouth. The spiral muscles of the œsophagus, with their fibres interlacing each other, are admirably suited to assist the ascent as well as the descent of the pellet of food.

THE DIFFICULTY OF PURGING CATTLE.

This account of the construction and function of the rumen will throw considerable light on some circumstances not a little annoying to the practitioner. It has been stated that a portion of the fluid swallowed usually enters the rumen, and that the quantity which actually enters it depends a little perhaps on the will of the animal, more on the manner in which the fluid was administered, but most of all on some state of the constitution over which we have no control. Accordingly it happens, and not unfrequently, and particularly under some diseases of an inflammatory nature, and in which physic is imperatively required, that although it is administered in a liquid form and as gently as possible, the greater part or the whole of it enters the rumen, and remains there totally inert. Dose after dose is administered, until the practitioner is tired, or afraid to give more; and,

ignorant of the anatomy and functions of the stomachs, he wonders at the obstinate constipation which seems to bid defiance to all purgative medicines; whereas, in fact, little or none of it had entered the intestinal canal. At length, perhaps, the rumen is excited to action, and ejects a considerable portion of its liquid, and some of its more solid contents, either directly into the œsophagean canal, or through the medium of the reticulum; and which, by an inverted and forcible contraction, is driven through the manyplus and into the fourth stomach, and thence into the intestinal canal, and produces sometimes natural, but at other times excessive and unmanageable and fatal purgation. The great quantity of fibrous substance which occasionally is found in the dung, warns us that this has taken place.

Occasionally, when dose after dose has been given, and the animal dies apparently constipated, the whole of the physic is found in the rumen. These are difficulties in cattle practice which are not yet sufficiently understood.

When two or three moderate doses have been given, and purging is not produced, the practitioner may begin to suspect that his medicine has fallen through this œsophagean fissure into the rumen; and then, although he does not quite discontinue the physic, he should principally endeavor to stimulate this cuticular, yet not quite insensible stomach. He should lessen the quantity of the purgative, and he should double or treble that of the aromatic and stimulant; and, in many cases, he will thus succeed in producing an intestinal evacuation, the fibrous nature of which will prove the unnatural process by which it was effected.

It was, perhaps, from observation of the occasional benefit derived from the administration of aromatics and stimulants, even in inflammatory cases, that the absurd and mischievous practice of giving them in every disease, and every state of disease, arose.

The reason and the propriety of the administration of cattle-medicine in a liquid form is hence evident. A ball, in consequence of its weight, and the forcible manner in which it is urged on by the muscles of the œsophagus, breaks through the floor of the œsophagean canal, and enters the rumen, and is lost. A liquid, administered slowly and carefully, and trickling down the œsophagus without the possibility of the muscles of that tube acting upon it and increasing its momentum, is likely to glide over this singular floor, and enter the fourth stomach and the intestines. A hint may hence be derived with regard to the manner of administering a drink. If it be poured down bodily from a large vessel, as is generally done, it will probably fall on the canal with sufficient force partly, at least, to separate the pillars, and a portion of it will enter the rumen and be useless.

In the calf, fed entirely on its mother's milk, the rumen is in a manner useless, for all the food goes on to the fourth stomach. It

is of a liquid form, and it is swallowed in small quantities, and with little force at each act of deglutition. The instinctive closure of the pillars—an act of organic life—(because the milk if suffered to fall into the rumen would be lost, or would undergo dangerous changes there)—has far more to do with the direction of the fluid than any mechanical effect resulting from the form of the aliment, or the force with which it descended the gullet. It is curious to observe the comparatively diminutive size of the rumen, and the development of the abomasum or digesting stomach in the fœtal calf.

THE SUBJECT OF RUMINATION, AND THE CHANGES OF THE FOOD RESUMED.

The food, being returned from the reticulum to the mouth, is there subjected to a second mastication, generally very leisurely performed, and which is continued until enough is ground not only to satisfy the cravings of hunger, but to fill the comparatively small true stomach and intestine of the animal; who then, if he is undisturbed, usually falls asleep. The act of rumination is accompanied, or closely followed, by that of digestion, and requires a considerable concentration of vital power; and hence the appearance of tranquillity and sleepy pleasure which the countenance of the beast presents. The rumen is rarely or never emptied; and probably the food that is returned for rumination is that which has been macerating in the stomach during many hours. The process of rumination is very easily interrupted.

The portion of food having been sufficiently comminuted, is at length swallowed a second time; and then, either being of a softer consistence, or not being so violently driven down the gullet, or, by some instinctive influence, it passes over the floor of the canal, without separating the pillars, and enters the manyplus, or third stomach. This is represented at *b*, p. 287, and *m*, p. 291.

The manyplus presents an admirable provision for that perfect comminution of the food which is requisite in an animal destined to supply us with nutriment both when living and when dead. That which is quite ground down is permitted to pass on; but the leaves, that have been described as hanging from the roof, and floating close over the œsophagean canal, and armed with numerous hook-formed papillæ, seize upon every particle of fibre that remains, and draw it up between them, and file it down by means of the hard prominences on their surfaces, and suffer it not to escape until it is reduced to a pulpy mass.

These three stomachs, then, are evidently designed for the preparation and comminution of the food before it enters the fourth stomach, in which the process of digestion may be said to commence, and where the food, already softened, is converted into a fluid called *chyme*. The villous coat of the abomasum abounds with small folli-

cular glands, whence is secreted a liquid called the *gastric juice*, and which is the agent in producing this chyme. The change, in all probability, merely consists in the food being more perfectly dissolved, and converted into a semi-fluid homogeneous mass. This form it must of necessity assume before its nutritive matter can be separated. The solution being complete, or as much so as it can be rendered, the food passes through the *pyloric*, or lower orifice of the stomach, into the duodenum, or first intestine, (*g*, p. 291,) where its separation into the nutritive and innutritive portions is effected, and the former begins to be taken up, and carried into the system.

We are now prepared to enter into the consideration of the diseases of this complicated apparatus, diseases of the rumen or paunch.

SWALLOWING INDIGESTIBLE SUBSTANCES,

Cattle have been known to swallow cloths, scissors, shoes, sticks, leather, indeed all sorts of things that could pass the throat.

The presence of bodies like these in the rumen cannot fail of being injurious to the animal. They must produce local irritation, interfering with the proper function of this stomach; suspending the process of rumination, or rendering it less effectually performed; and exciting inflammation, probably of the stomach generally, as this foreign body is traversing its different compartments, or of some particular portion in which it may be accidentally arrested, and leading on to abscess and perforation of the stomach at that spot. The symptoms which would indicate this peculiar cause of disease are not yet sufficiently known; but there must be considerable disturbance when a body sufficiently hard and pointed thus to force its way commences its journey. Inflammation, as conducting to suppuration and destruction of the living substance, must precede its course and make way for it. The nerves and blood-vessels which lie in its way are, with mysterious skill, unerringly avoided, and as little injury as possible is done to the neighboring tissues; but local inflammation and pain attend the whole process, which, in many cases, are accompanied by general and severe disease.

It is seldom that medical skill could be of avail here, until the substance approaches to the skin, even if the case were understood.

CONCRETIONS, OR STONES IN THE RUMEN.

A frequent and serious complaint is the formation of various concretions in the rumen. They are generally round, but occasionally of various forms, and varying likewise in weight from a few ounces to six or seven pounds. The composition of these balls is also very different. Those which are decidedly peculiar to cattle are composed entirely of hair, matted together by the mucous secretion from the follicular glands of the stomach. Sometimes they have no distinct

central body ; at other times it exists in the form of a bit of straw or wood, or frequently of stone or iron. They exist in the rumen, and in the abomasum. In the abomasum they are composed exclusively of hair, irregularly matted and held together by the mucus of the stomach ; in the rumen there is generally a mixture of food, or earthy matter, in the composition of the concretion. When simple food mingles with the hair, the ball seems to be formed by a succession of concentric layers, and in the centre is a bit of nail or stone ; or, if the beasts have access to running water, a piece of shell often constitutes the nucleus.

The hair is obtained by the habit which cattle, and even very young calves, have, of licking each other. A considerable quantity of hair is loosened and removed by the rough tongues of these animals, the greater part of which is swallowed ; and there seems to be a kind of power in the stomach to separate these indigestible matters from the other substances which it contains. It is also easy to imagine that the hairs which the manyplus, with all its grinding power, cannot rub down, will collect together when floating in the semi-fluid contents of the fourth stomach, and gradually accumulate in considerable and hard masses. These balls will begin to form at a very early age of the animal.

When only a little hair enters into the formation of these calculi, they are usually made up of earthy matter, with bits of hay, straw, or other food, glued together by the mucus of the stomach. These have uniformly a hard central nucleus, generally metallic. The concentric layers can here also be traced, but they are, occasionally, somewhat confused.

In some cases, various compounds of lime, and still more of silicious matter, can be detected by chemical analysis. These concretions are round ; they are seldom found except in the rumen, and never in the intestines ; and there is always a central nucleus of stone or metal ; the concentric layers are regularly and beautifully marked ; and the concretion, when sawed asunder, will bear a high degree of polish.

Of the effect of these substances on the health of the animal it is difficult to speak. One thing, however, is certain, that they are oftener found and in greater numbers in those that are ailing and out of condition, than in stronger and thriving beasts ; but whether some fault in the digestive organs, indicated by this poorness of condition, gives a tendency to the formation of concretions in the paunch, or the presence of these concretions impairs the digestive powers and produces general unthriftiness, are questions which it is difficult to answer. Each opinion may in its turn be true, but it is probable that the latter state of things oftenest occurs. These calculi are, with few exceptions, confined to the stomach, where they may produce a sense of oppression and impairment of appetite, but cannot be the cause of colic, obstruction, inflammation, and strangulation of the intestines.

DISTENSION OF THE RUMEN FROM FOOD.

Cattle, when first put on succulent grass or turnips, or when suffered to gorge themselves with potatoes or grains, or even with chaff, will sometimes distend the rumen almost to bursting.

The history of the case will generally unfold the nature of it; and it will be distinguished from hoove by its not being attended by occasional eructation, by the swelling not being so great as in hoove, and by the hardness of the flanks. Should any doubt, however, remain, the probang should be passed into the rumen, when, if that be distended with gas, a sudden and violent rush of the imprisoned air will follow. The probang, however, should *always* be used, not only to determine this point, but the degree to which the rumen is distended by food.

When, although the animal may be dull, refusing to eat, and ceasing to ruminate, generally lying down and showing great disinclination to move, yet the pulse is not materially quickened, and the muscle is cool and moist, and there is little heaving at the flanks, and no indication of pain, the practitioner may content himself with a free bleeding and a powerful dose of physic. These symptoms, however, are often treacherous, and, without warning, uneasiness, heaving, stupor, and death may rapidly succeed.

In mild cases, stimulants may be resorted to with frequent advantage. Ammonia, ether, aromatics, and spirits, have succeeded in rousing the stomach to action, and establishing the process of rumination; and that once established, there is little fear of the result of the case. These stimulants should, however, be always accompanied by aperient medicines.

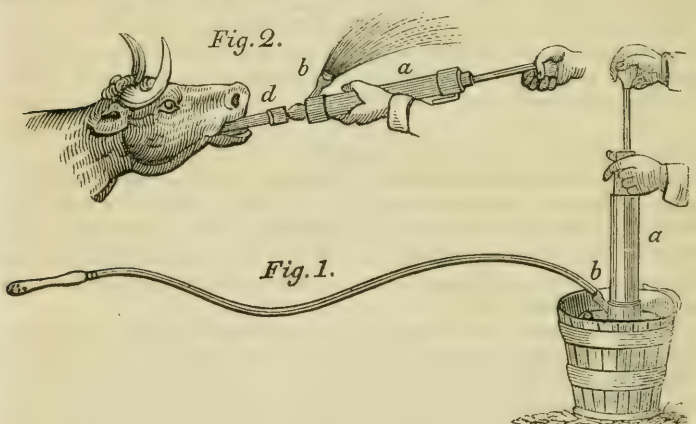
When, however, the symptoms are sudden dullness, uneasiness, shifting of posture, moaning, swelling at the sides, the flank feeling hard and not yielding to pressure; when rumination ceases, and the uneasiness and moaning increase, and the animal gradually becomes unconscious, this will admit of no delay, and demands mechanical relief; the introduction of the probang will ascertain the degree of distension.

Should the probang enter a little way into the stomach, and the operator be able to move it about, he will have proof that, although the paunch is sufficiently distended to produce severe annoyance and considerable danger to the animal, it is not stretched to the utmost; he may first try the effect of mild measures, and he will be especially encouraged to attempt this if he finds that the food is of a rather light nature.

If the probang cannot be introduced at all into the rumen, or the food eaten is heavy, as grains, or potatoes, or corn, the most judicious plan will be to make an incision without delay through the left flank into the rumen, and thus extract its contents.

This mode of proceeding, however, is recommended only in cases of extreme distension with heavy food. The rumen of cattle, with few blood-vessels and nerves, will endure very severe treatment without serious injury. The principal danger is, and it exists to a considerable extent, that a portion of the food will, during the extrication of the rest from the stomach, fall between the skin and the wall of the rumen into the abdomen, and there remain, a source of irritation, and the unsuspected cause of serious and fatal disease.

A beast, whose paunch has been distended to any considerable degree, should be prepared for the butcher, or sold immediately, if in tolerable condition; for a stomach, whose muscular fibres have been so stretched and enfeebled, will not soon do its full duty again; or a small portion of food, which, notwithstanding the most careful management, may fall into the belly, will sometimes, after a while, produce inflammation of the intestines, and death.



STOMACH PUMP.

This consists of a large syringe. The cuts, Nos. 1 and 2, show its use or application. It has an opening on the side at *b*.

When a medicine, or food, (as gruel) or water is to be forced into the stomach, a hollow pipe, *b*, fig. 1, is put down the throat, and then attached to the syringe at the opening at *b*. The syringe is then put into a vessel containing whatever is to be thrown into the stomach and pumped in. In the same manner injections are to be given.

Whenever the contents of the stomach are to be drawn out, then the pipe, *d*, fig. 2, is put down the throat, into the stomach, and the handle of the syringe drawn back, when the contents of the stomach are brought up and pass out at the side opening, *b*.

HOOVE, BLOWN, OR DISTENSION OF THE STOMACH FROM GAS.

If a beast, taken from poor or less nutritive food, is put upon clover, or turnips, or rich-fog, it eats so greedily and so much, that the rumen ceases to act. These green vegetable substances are naturally subject to fermentation, during which much gas is extricated, but when inclosed in the stomach and exposed to the combined influence of heat and moisture, the commencement of the fermentation is hastened, and its effect increased.

The "Hoove" or "Blown" is distension of the rumen, by gas extricated from substances undergoing the process of fermentation within it. In a healthy discharge of the functions of the stomach, the food simply undergoes a process of maceration or softening; but if the food be retained in the stomach longer than the usual period, it, or perhaps only a portion of the juices which it contains, begins to ferment; or, as in animals with simple stomachs, even this preparatory one may so sympathize with certain states of the constitution, as either to secrete an acid principle, or to favor the development of it in the food. It is from this cause that some degree of hoove accompanies most fevers, and it is the consequence of general irritation produced by obstruction of the œsophagus; it sometimes accompanies difficult parturition, and to such an extent, that it is necessary to puncture the rumen before the calf can descend sufficiently low into the pelvis to be extracted.

Its most frequent cause, however, is the turning of a beast from poor, or less nutritious food, into plentiful and luxuriant pasture, when he frequently eats so greedily, and so much, that the stomach is overloaded, and is unable to circulate the food through it cavities, and from the combined action of heat and moisture, its contents speedily ferment, and gas is extricated. The following are the symptoms:—

The animal gradually becomes oppressed and distressed. It ceases to eat; it does not ruminate; it scarcely moves; but it stands with its head extended, breathing heavily, and moaning. The whole belly is blown up; this is particularly evident at the flanks, and most of all at the left flank, under which the posterior division of the rumen lies. The rumen in cattle is scantily supplied with either blood-vessels or nerves, and therefore the brain is seldom much affected in an early stage of hoove. Swelling, unwillingness to move, and laborious breathing, are the first and distinguishing symptoms. In proportion as the stomach becomes distended by the extricated gas, the case becomes more desperate, not only from the pressure on the other contents of the abdomen, thus impeding the circulation of the blood, and also on the diaphragm, against which the rumen abuts, and thus impeding respiration, and also the danger of rupture of the paunch, but the construction of the œsophagean canal renders it manifest that the rumen will be more obstinately closed in proportion as it is dis-

tended. It is the relaxation of the muscular fibres which causes the two pillars that constitute the floor of the canal and the roof of the rumen to be easily opened, either for the admission or the return of food; but when the stomach is filled and elongated, as well as widened, these fleshy pillars must be stretched, and in proportion as they are distended, will they be brought closer to each other, and firmly held there. When the rumen is filling, there are occasional eructations of a sour or fetid character; but when the stomach is once filled, there is no longer the possibility of escape for its contents.

The animal cannot long sustain this derangement of important parts; inflammation is set up, and the circulation becomes seriously and dangerously disturbed by this partial obstruction. Affection of the brain comes at last, characterized by fullness of the vessels, hardness of the pulse, redness of the conjunctiva, and protrusion of the eye. The tongue hangs from the mouth, and the mouth is filled with spume. The beast stands with his back bent, his legs as much as possible under him; and he gradually becomes insensible—immovable—moans—falls—struggles with some violence, and as death approaches, some relaxation of the parts ensues, and a quantity of green sour liquid, occasionally mixed with more solid food, flows from the mouth and nose.

In order to save the animal, the gas must be liberated or otherwise got rid of. Some persons, when symptoms of hoove appear, drive the animal about, and keep him for a while in constant motion. It is supposed, that in the motion of all the contents of the abdomen, while the animal is moving briskly about, the pillars of the roof of the paunch must be for a moment relaxed, and opportunity given for the gas to escape into the œsophagean canal, and through the gullet; and this will, undoubtedly, be the case to a certain degree. The ox cannot without much difficulty, and often not at all, be induced to move with rapidity, which is necessary to produce concussions sufficiently powerful to shorten and disunite the muscular pillars. There must also be some danger of rupturing the stomach so much distended, or the diaphragm, against which it is pressing, by the very production of these concussions.

Alkalies have been recommended, as almost a specific. It may be conceded that the alkali would be likely to neutralize the acid contents of the stomach; but there is one objection to it, viz., that the same closing of the roof of the rumen, which prevents the escape of the gas, would also prevent the entrance of the alkali, which would, consequently, pass on to the third and fourch stomachs, where there is no acid for it to neutralize.

Oil (whether olive, or spermaceti, or castor, or common whale oil, seems to be a matter of indifference) will sometimes prove serviceable in cases of hoove; but it is either at the very commencement, before the muscular pillars are tightened, and when a portion of it can

enter the paunch, and produce a disposition to vomiting or purging; or, if the whole passes on into the fourth stomach, and so into the intestinal canal, a sympathetic but inverted action is excited in the rumen, and a portion of its contents is sent, by an unusual passage, from the rumen through the third and into the fourth stomach, and so relief is obtained. In this way purging is occasionally established, either in consequence of a stimulus applied immediately to the coats of the first stomach, or from sympathy with the action going forward in the intestinal canal, and a portion of the food is carried from the rumen into the intestines without being returned to the mouth to be remasticated. The grassy and harder fibres, sometimes found in the dung in considerable quantities, prove that that portion of it could not have undergone rumination. This, however, is not striking at the root of the evil.

The object to be accomplished is the extrication of the gas, and the prevention of any fresh quantity of it being developed. If the farmer or the practitioner, at a distance from home, sees any of his cattle so dangerously hoven or swelled as to threaten speedy death, he adopts a summary mode of getting rid of the gas: he takes a sharp-pointed knife, and plunges it into the left side, underneath, and in contact with which the rumen is found. The gas rushes violently through the aperture, carrying with it steam, and fluid, and pieces of food. The belly falls, and the beast is immediately relieved. The safest place for this operation is the following:—Supposing a line to be drawn close along the vertebræ, from the haunch-bone to the last rib, and two other lines of equal length to extend down the flank, so as to form an equilateral triangle, the apex of the triangle, or the point where these lines would meet, would be the proper place for the operation, for there is no danger of wounding either the spleen or the kidney.

It may also be suggested, that a small trochar is far preferable to a knife for this operation, and might very conveniently be carried in the instrument-case of the surgeon, or the pocket of the farmer. It consists of a short strong stilett, terminating in three cutting-edges converging to a point, and having a handle that may be grasped with some force. To this is accurately fitted a silver tube, reaching from the termination of the three edges to the handle. This is plunged into the flank; the stilett is then withdrawn and the tube remains as long as the operator pleases, and may be secured by tapes attached to two rings at the base of it, and tied round the body of the animal.

The gas is certainly extricated by the knife or trochar, and generally successfully so. When gas ceases to escape, it may be taken for granted that the manufacture of it has ceased in the rumen; the trocar may then be withdrawn, and the wound will speedily heal. There are, however, occasional bad consequences, which are altogether

unsuspected. At the commencement of the operation, when the skin of the side is in close contact with the paunch, the gas, fluid, and fibrous matter will all be safely thrown out through the two wounds, for, lying upon each other, they are but as one; but when the paunch is partially emptied of the gas, it sinks, and is no longer in contact with the outside skin. The gas and particles of solid food continue to be discharged for a considerable time after this; and although the greater part may be ejected with sufficient force to be driven through the aperture in the skin, yet some portion will necessarily fall into the abdomen and remain there. This will, ere long, become a source of considerable and dangerous irritation, slow or rapid in its progress and effects, according to the quantity of food that has escaped from the stomach into the abdominal cavity: accordingly it happens, that although the beast may appear to be perfectly relieved by this operation, he does not thrive well afterwards, and in the course of a few weeks or months, sickens and dies of some obscure disease, but which is principally referable to inflammatory affection of the abdomen. Therefore, the farmer or practitioner who has faith in an occasional recourse to the mode of cure by puncturing the rumen, should always carry a trochar with him, for the tube penetrating three or four inches into the abdomen, forms a continuous passage between the rumen and the skin, notwithstanding the subsidence of the former, and would prevent the escape of any portion of the contents of the rumen into the abdomen.

Although a portion of the gas may be liberated by this operation, yet the process of fermentation may proceed. The gas may escape, but that which would furnish a continued, annoying, and dangerous supply of it, remains. Then the advocates for opening the paunch carry their operations a little farther. They enlarge the aperture into the paunch, until, as in bad cases of maw-bound, they can introduce their hand, and shovel out the contents; and, as before stated, the stomach, from its comparative insensibility and want of vitality, bears all this without any considerable inflammation or danger; there is however, the same danger from the escape of a portion of the contents into the cavity of the belly.

This larger opening into the rumen should never be attempted except by a person perfectly acquainted with the anatomy of cattle, and the precise situation of the viscera of the belly, for otherwise the kidneys or the intestines may be wounded.

It was the knowledge that the practice of puncturing the rumen was not so simple and so free from danger as some had imagined, that led to the invention and use of the *probang* and *stomach-pump*. The tube (fig. 1, *a*, p. 280) is introduced into the mouth, and is passed down the throat, with the rounded extremity, *e*, downward, and is forced on through the pillars of the œsophagean canal: the stilett is then withdrawn, and the gas rushes violently out. The

tube is continued in the mouth until the belly sinks, and little gas escapes: the animal is greatly relieved, and if it begins to swell again, the probang is once more introduced. But the tube cannot remain in the mouth and gullet for any great length of time; and when it is withdrawn, the manufacture of gas may continue undiminished, and the relief be only temporary, and so far the probang may be in some degree inferior to the trochar.

The practitioner then has recourse to the stomach-pump, and throws in a considerable quantity of warm water, and pumps it out again; and repeats the operation until he has washed away all the acid fermenting fluid, and then usually the process of rumination recommences, and the animal does well. Sometimes he so overcharges the stomach that vomiting is produced, and a great portion of the contents of the rumen is thus discharged.

Alkalies have been thrown into the stomach to neutralize the supposed acid principle which there prevailed. As, however, a very small portion of it, if any, enters the rumen, it will principally do good, and much good it frequently does effect, by its stimulant effect on the fourth stomach, propagated by sympathy to the first.

Hoove, however, had long been considered to be a case in which the aid of chemistry might be resorted to with considerable benefit. It had been suspected that the gas consisted principally of hydrogen; for when a lighted candle had been accidentally brought into contact with the vapor as it rushed from the aperture in the flank, the gas immediately caught fire. Careful analysis indicated that the gas was differently combined in different stages. In recent hoove it consisted chiefly of carburetted hydrogen—the union of carbon with hydrogen; in more chronic cases there was a mixture of sulphuretted hydrogen—the union of sulphur and hydrogen; and, in proportion to the continuance of the hoove, the sulphuretted hydrogen increased, and at length prevailed. In both cases hydrogen was the chief constituent.

Then came the inquiry, whether something might not be introduced into the stomach which would combine with the gas already extricated and cause it to disappear, and also prevent its future accumulation, by combining with it as soon as it was produced.

A method was soon discovered. Chlorine has affinity for various substances, as lime, potash, and soda; and in combination with either of these could be used. When introduced by means of the stomach-pump into the rumen, the chlorine will separate itself from the alkali, and combine with the hydrogen, for which it has a more powerful affinity, and forms muriatic gas. This gas has a strong affinity for water, and will be quickly absorbed by the fluid always contained within the stomach; and so, quitting its gaseous for a fluid form, it quickly disappears, or will not retain a thousandth part of its former bulk, and muriatic acid will be formed. At the same time,

the lime or potash, or soda, will be liberated; yet no danger results from the presence of this corroding acid and caustic alkali; for there is a chemical affinity between them which will be soon exerted, and the harmless and inert muriates of lime or potash, or soda, be produced. Hence resulted one of the most important improvements in cattle-medicine that modern times have produced.

There are several other medicaments which have been found of great service in this disease, such as lime-water, potash, hartshorn, and particularly sulphuric ether. About an ounce and a half of hartshorn may be given in a pint and a half of water, unless the symptoms are so urgent as to threaten immediate suffocation: then the flexible tube, if at hand, should be used; or, if not, the trochar, or the knife, plunged into the flank. If the symptoms should denote any inflammation, ether will be preferable as a medicine, as it promptly condenses the gases: an ounce may be given in a pint of water. If the symptoms are produced by green food, there is less probability of inflammation than if the food has been previously dry.

The chloride of lime is as good as either of the others, and should always be in the possession of the farmer and practitioner, not only for this purpose, but because, in cases of foul, fetid ulceration, and gangrene generally, it is the most powerful disinfectant, and the most useful stimulant that can be applied. The proper and safe dose is two drachms of the powdered chloride of lime dissolved in two quarts of water, and injected into the paunch by means of the stomach-pump. This may be repeated an hour afterward, if circumstances should appear to require it.

The trochar will then supersede the use of the knife and the lancet, when, under circumstances of emergency, the practitioner may be compelled to act promptly; for, by the continuance of the tube in the wound, some of the distant and unsuspected results of the common method of puncturing the rumen may be avoided; but when the practioner is near home, or can obtain speedy access to his stomach-tube and pump, the trochar will be completely discarded.

The animal having been relieved, and the gas ceasing to distend the paunch, a pound of Epsom salts should be administered with an ounce of carraway powder, and half an ounce of ginger; and, on several successive mornings, four ounces of Epsom salts, two of powdered gentian, and half an ounce of ginger should be given. The object of the practitioner, or the owner, should be to restore, as speedily and as effectually as possible, the tone and action of the rumen. The return of the process of rumination will show when that is beginning to be effected, and rumination will usually precede the desire to eat.

Attention should for some time be paid to the manner of feeding. A mash should be daily allowed, and the pasture on which the beast

is turned should be short and bare, rather than luxuriant. The over-distended stomach of the hoven beast will not soon, and in most cases will never, quite recover its former energy; and if the beast be in tolerable condition, it should be sent to the butcher, or it should be got ready for the market as quickly as that can with safety be effected.

Sucking calves are occasionally subject to hoove. Little more will be necessary in this case than the introduction of the probang. This distension of the rumen arises from some accidental and temporary cause, and there is rarely any continued manufacture of gas within the stomach. Some calves become blown from the trick which they frequently have of sucking each other's pizzle or ear. It is curious to see with what eagerness they will do this, and how quickly they blow themselves up by the air which they draw in and swallow. The introduction of the probang will be sufficient here, but it will be prudent to separate the animals.

Homœopathic treatment.—*Colchicum autumnale* rarely fails in its effects, and ordinarily it establishes an instantaneous cure. Sometimes, however, it must be repeated two, three, and even four times. Occasionally the symptoms subside without the animal voiding any wind. In chronic meteorization, or formation of gas, which is renewed frequently, *colchicum* taken alternately with *arsenicum* is very useful. Benefit it is said has been derived from *china*. If rumination be not re-established at the time the disease is cured, *aconitum* must be given, and after some hours, *arsenicum*. When meteorization, gas, has been caused not by green fodder, but by some disturbance of digestion, we must have recourse to *nux vomica;* the same substance is suitable, when the disease is attributable to the animal's having eaten *colchicum* in the meadows.

Lastly, when the danger has become so pressing that we are brought to the necessity of puncturing in order to avoid death, it is, however, still necessary to administer the *colchicum* after having cleansed the mouth carefully; after some time a few doses of *arnica* must be given.

LOSS OF CUD.

The cessation of rumination, designated by the term "the loss of cud," is more a symptom of disease, than a disease of itself. It accompanies most inflammatory complaints, and is often connected with those of debility. It will be the duty of the practitioner to ascertain the cause of this suspension of second mastication, and to adapt his mode of treatment to the nature of that cause. A dose of physic, with a very small portion of aromatic medicine, will be indicated if any fever can be detected; more than the usual quantity of the aromatic will be added in the absence of fever, and still more, with tonic and alterative medicine, if general debility be indicated.

The carraway and ginger powder are the best aromatics that can be employed, and will supersede every other: the gentian and ginger, with Epsom salts, as recommended in page 308, will prove a very useful tonic and alterative, in cases of "loss of cud" that cannot be traced to any particular diseased state of the animal, or that seems to be connected with general debility.

INFLAMMATION OF THE RUMEN.

In almost every book on cattle-medicine mention is made of "inflammation of the stomach;" and certainly cases do, although but rarely, occur, in which evident traces of inflammation of the rumen may be discovered on examination after death. The cuticular coat is not discolored, but it peels from the mucous coat below at the slightest touch, and that coat is red and injected. This is particularly the case when a beast dies soon after apparent recovery from distension of the stomach by gas, or when he is destroyed by the accumulation of solid food that could not be removed. It is likewise found in every case of poisoning, but the symptoms during life are so obscure that it would be useless to bestow further time on the consideration of this disease.

POISONS.

Nature has endowed the brute with an acuteness of the various senses, and with a degree of instinct which, so far as the life and enjoyment and usefulness of the animal are concerned, fully compensate for the lack of the intelligence of the human being. The quadruped is scarcely born ere he is mysteriously guided, and without any of the lessons of experience, to the kind of food which affords him the most suitable nourishment, and he is warned from that which would be deleterious. There is scarcely a pasture which does not contain some poisonous plants, yet the beast crops the grass close around them, without gathering a particle of that which would be injurious. In the spring of the year, however, and especially after they have been kept in the stall or the straw-yard during the winter, and supported chiefly on dry food, as soon as they are turned into the fields cattle eat greedily of every herb that presents itself, and frequently are seriously diseased, and sometimes quite poisoned. They are under the influence of appetite almost ungovernable, and few plants have then acquired their distinguishing form and color, and taste and smell. The common and water-hemlock, the water dropwort, and the yew, are the principal plants that are poisonous to cattle; but it is said that the common crow-foot, and various others of the ranunculus family, the wild parsnip, black henbane, and the wild poppy, are occasionally destructive.

The symptoms of poisoning by these acrid and narcotic plants are obscure, unless they can be connected with the history of the case. They are principally sudden swelling, with a peculiar stupor, in the

early stage of the attack: cessation of rumination; a change in the quality of the milk, which becomes thin and serous, and presently ceases to be secreted; the refusal of all solid food, and eagerness after water; quickening of the pulse, which yet becomes small, and, in some cases, scarcely to be felt; and the animal frequently grinds the teeth, and paws, and rolls, as if it felt severe colic pains. In a few instances the stupor passes over, and a degree of excitement and blind fury succeeds, which has been mistaken for madness.

On examination after death, the greater part of the poison is usually found in the paunch, but, in a few cases, it has been remasticated, and conveyed into the fourth stomach and intestines. The sense of taste does not seem to be very acute in cattle; it is a sleepy kind of pleasure which they feel in rumination, and the acrid and bitter flavor of many a plant appears to give them little annoyance.

Inflammation is found in the paunch and second stomach, characterized by the ease with which the cuticular coat is separated from that beneath. The manyplus is usually filled with dry and hardened food; and the fourth stomach and intestines exhibit inflammation and ulceration proportioned to the acrimony of the poison, and the quantity of it which had passed into these viscera.

Little can be done in the way of medicine when cattle have browsed on these poisonous plants, and the only hope of the practitioner must be founded on the early and persevering use of the stomach-pump. Plenty of warm water should be injected and pumped out, and that repeated again and again; and at length the stomach should be fully distended with water, for the purpose, and in the hope of, producing vomiting. Whether this succeeds or not, a brisk purgative should be next administered, but as cautiously and gently as possible, that it may pass on over the closed floor of the œsophagean canal into the fourth stomach, and not, by the power with which it descends, force open the pillars that compose that floor, and enter the rumen and be lost. Tonics and aromatics will here also follow the evacuation of the stomach, in order to restore its tone.

While speaking of poisons, it will, perhaps, be proper to mention that cattle are sometimes exposed to extreme danger from the application of deleterious mineral preparations for the cure of mange and other cutaneous eruptions.

It is no unusual thing for cattle that have been incautiously dressed with a strong solution of corrosive sublimate, to become seriously ill. They cease to eat and to ruminate; the saliva drivels from their mouths; they paw with their feet; look anxiously at their flanks, and are violently purged—blood usually mingling with the fæces.

The remedy, if there be time and opportunity to have recourse to it, is the white of several eggs, beaten up with thick gruel, and gently poured down the throat, that it may be more likely to pass on to the fourth stomach; and this repeated every hour, until the animal is

either relieved or dead. As soon as decided relief is obtained, a dose of physic should be given, and if any fever seems to be coming on, a few pounds of blood should be taken away.

Cattle in the neighborhood of lead-mines have been dangerously affected from the effects of this ore in the grass. Difficult respiration with loud wheezing is one of the most prominent symptoms, the beast losing its appetite, pining away, and at length dying of suffocation or attacked by epileptic symptoms. Large doses of Epsom or Glauber's salts, with linseed oil, and followed by opium, are the best remedies. The smoke from copper-mines has also produced sad disease amongst animals in the neighborhood: it causes swellings of the joints, of a painful description. An early removal to another soil forms the best treatment.

Ranking under the general term of poisons, we may mention the bites of venomous reptiles. The beast is generally stung about the head or feet, for it is most likely to disturb these reptiles either in the act of browsing, or as it wanders over the pasture. Cattle bitten in the tongue almost invariably die. They are suffocated by the rapid swelling which takes place. The udder has occasionally been stung; but the supposed bites on the teats are, far oftener than otherwise, the effect of garget.

Embrocation for Bite of Reptiles.—Take hartshorn, and olive oil, equal quantities. Shake them well together, and rub the wound and the neighboring parts well with the liniment morning and night.

A quart of olive oil should also be given to the animal, mixed with an ounce of hartshorn. Oil of turpentine may be used when hartshorn cannot be procured; but it is not so much to be depended upon.

The stings of hornets, wasps, and bees, in some cases produce much temporary swelling and pain. If the part be well rubbed with warm vinegar, the inconvenience will soon subside.

DISEASES OF THE RETICULUM.

Of these, in the present state of knowledge of cattle-medicine, little can be said. Some of the foreign substances that are found in the rumen have been occasionaly discovered in the reticulum, as pins, pieces of wire, nails, small stones, &c. They were, probably, ejected over the valve between the two stomachs, enveloped by, or attached to, the portion of food that was preparing for a second mastication. In the forcible contraction of the stomach, it has been severely wounded by these, and so much inflammation has ensued that the animal has been lost.

The writer of this treatise has frequently seen inflammation of the second stomach—sometimes accompanying that of the paunch, and at other times seemingly confined to the reticulum. This inflammation was, as in the rumen, characterized by the peeling off of the cuticular coat, and the redness of the tissue beneath it; but the

symptoms were so different in different cases, and always so obscure, that no legitimate conclusion could be drawn from the appearances that presented themselves.

DISEASES OF THE MANYPLUS, OR MANIFOLDS.

Although the function of this stomach is one of a purely mechanical nature, there seems to be a strong bond of sympathy between it and almost every part of the frame. There are few serious diseases by which cattle are afflicted, and none of an acute and inflammatory nature, in which the manyplus is not involved. It is so common in cases of catarrh, constipation, inflammation of the lungs or bowels, simple fever, dropping after calving, blain, and even murrain, to find the manyplus either choked with food in a hardened state, or, if continuing soft, yet having become exceedingly putrid and emitting a most nauseous smell, that the idea of the animal being *fardel-bound*, or having disease of the *faik*, is always present in the mind of the farmer and the country practitioner. They are seldom wrong in this surmise, for the fardel-bag either sympathizes with the diseases of other parts, or is the original seat and focus of disease.

The manyplus has been described as containing numerous leaves, curtains, or duplicatures of its cuticular coat, and with interposed layers of muscular and vascular tissue, which hang from its roof and float loose in its cavity. These leaves are covered with innumerable little hard papillæ or prominences; and many of these, and especially toward the lower edges, assume a greater degree of bulk, and something of a hook-like form. Those portions of food that are returned after the second mastication, that have not been thoroughly ground down, are seized by these hooked edges of the leaves and drawn up between them, and there retained until, by the action of these flexible grindstones, they are sufficiently comminuted for the purpose of digestion.

It is easy to imagine that, either sharing in the irritability of other parts, or being the original seat of irritation and inflammation, the manyplus may spasmodically contract upon and forcibly detain the substances that have been thus taken up between its leaves. By this contraction the natural moisture of the food, or that which it had acquired in the processes of maceration and mastication, is mechanically squeezed out, or drained away by the very position of the leaves, and a hard and dry mass necessarily remains. When the contraction is violent, and this imprisonment of the food long continued, we can even conceive of the possibility of its becoming so hardened and dry as to be snapped between the fingers, and to be capable of being reduced to powder. The description of it is not exaggerated when it is said to "look as if it had been baked in an oven." On the other hand, it can as readily be imagined that, either debilitated by inflammatory action peculiar to itself, or sympathizing with and sharing in the debility of other parts, the leaves may have lost the power of

acting on the food contained between them, and which, supported by the irregularities of the cuticular coat, and imprisoned there in a somewhat pultaceous form, will gradually become putrid and offensive.

The animal may be fed on too dry and fibrous matter, or he may lazily and but half perform the process of rumination; in consequence of this, the hard parts of the food may accumulate in the manyplus more rapidly than they can be ground down, and so the stomach may become clogged and its function suspended. Whatever the cause, this state of contraction or inaction of the manyplus often occurs, and either aggravates the pre-existing malady, or becomes a new source of disease, and hastens or causes the death of the animal.

When this stomach has been spasmodically contracted, or long and forcibly distended, the imprisoned food presents a very curious appearance. There is an indentation of the papillæ on the surface of the detained mass. All this force must have produced inflammation of the part; and that intense inflammation does occasionally exist in the manyplus, sufficient to produce great and general derangement and even to destroy the beast, is evident by the easy separation of the cuticular coat. In many cases, or perhaps in the majority of them, it is impossible to remove the detained mass from its situation without a portion of the cuticular coat accompanying and covering it. Even this hardened state of the contents of the manyplus is not always a proof of general disease. It is an unnatural and morbid state of the stomach; but very considerable local disease may exist in this organ, without materially, or in any appreciable degree, interfering with general health and good condition. The fardel-bag has been found choked with food, and that dry and black, and roasted, and yet the beast had apparently been in perfect health.

The author of this treatise has seen the loss of function confined to one part only of this stomach. Between some of the leaves, or on one side or curvature of the manyplus, the contents have been green and fluid; in the other portion of it they have been perfectly baked. It is a wise and kind provision of nature, that the general health and thriving of the animal shall in various cases be so little impaired by local, although serious, disease. Many a trifling circumstance, nevertheless, may cause this local evil to spread rapidly and widely; and, even without any additional excitement, the mere continuance of such a disease, accompanied by such derangement of function, can scarcely fail of being attended by injurious consequences.

This state of the manyplus is one of the most serious species of indigestion to which these animals are subject, and deserves the attentive consideration of the practitioner. There are, nevertheless, many difficulties accompanying the study of this important subject.

The *clue* or *fardel-bound*, names by which the retention of the food in the manifolds is distinguished, may be occasionally produced by the animal feeding on too stimulating plants, or on those which are

of a narcotic nature. A sudden change from green and succulent food to that which is hard and fibrous may also readily be supposed to be a very likely cause of it. The strange fancy that induces many cows, and especially those in calf, to refuse the soft and nutritious food of the pasture and browse on the coarse grass and weeds which the hedges produce, will necessarily overload the manyplus with hard and fibrous substances; and many a beast has suffered in this way from being too rapidly and exclusively put on chaff of various kinds.

The symptoms vary in different animals, but the following is an outline of them: the animal is evidently oppressed; the pulse is somewhat accelerated and hard; the respiration not much quickened; the muzze dry; the mouth hot; the tongue protruded, and seemingly enlarged; the membrane both of the eyes and nose injected; the eye protruded or weeping; the head extended; the animal unwilling to move; the gait uncertain and staggering; the urine generally voided with difficulty, and sometimes red and even black. There is apparent and obstinate costiveness, yet small quantities of liquid fæces are discharged. As the disease proceeds, and often at an early period, there is evident determination of blood to the head, evinced not only by this staggering gait, but by a degree of unconsciousness; the eyes weep more; the lids are swollen; the costiveness continues or some hardened excrement is voided, but fetid and mixed with blood; rumination ceases; the secretion of milk is usually suspended, or the milk becomes offensive both in taste and smell; the urine flows more abundantly, but that too continues of a dark color.

Many of these symptoms distinguish this complaint from distension of the rumen; there is not the hardness at the flanks, and the general swelling of the belly, which is observed in distension by food; nor the greater distension and threatened suffocation which accompany hoove. In bad cases, and when the symptoms take on much of the character of that undescribed and unintelligible disease, wood-evil—trembling of the frame generally, a degree of palsy, coldness of the extremities, actual swelling of the tongue, the eyes glaring, and the ears and the tail being in frequent and convulsive motion—these are the precursors of death.

The period of the termination of the disease is uncertain; it extends from three or four days to more than as many weeks. Many of these symptoms so often accompany other diseases, that they are utterly insufficient always or generally to lead to a right conclusion as to the nature of the complaint, and careful inquiry must be made into the history of the case.

The treatment is as unsatisfactory as the history of the symptoms. It will always be proper to bleed, in order to diminish any existing fever, or to prevent the occurrence of that which continued disease of this important stomach would be likely to produce. To this should follow a dose of physic, in order to evacuate the intestines

beyond the place of obstruction, and, by its action on them, possibly recall this viscus also to the discharge of its healthy function. The Epsom salts, with half the usual quantity of ginger, will form the best purgative; and it should be administered either by means of a small horn, or the pipe of the stomach-pump introduced half way down the gullet, and the liquid very slowly pumped in. By this cautious method of proceeding, the pillars of the œsophagean canal will probably not be forced open, and the liquid will flow on through the passage still partially open at the bottom of the manyplus, and thence into the abomasum. Of the sympathetic influence which the establishment of increased action of the intestines has on the stomachs above in rousing them to their wonted function, mention has already been made; it is a fact of much importance, and should never be forgotten by the practitioner.

A consideration of the nature of the disease will necessarily lead to the next step. Either a great quantity of food is retained between the leaves of the manyplus in a natural and softened state, or it is powerfully compressed there, and has become dry and hard. Now the longer leaves of this stomach reach from the roof almost or quite to the base of it, and some of them float in the continuation of the œsophagean canal through which all fluids pass in their way to the fourth stomach. Then plenty of fluid should be made to flow through this canal; and this may readily be effected by the small horn, or much better by the stomach-pump. An almost constant current of warm water may thus be kept up through the canal, by means of which the food retained towards the lower edge of the leaves, and most obstinately retained there on account of the hook-like form of the papillæ, will be gradually softened and washed out. This will leave room for the descent of more; and the natural action of this portion of the leaves being possibly re-established, when freed from the weight and oppression of that by which they had been filled, the mass that remains above will begin to be loosened; it will gradually descend and be softened by the stream, and it too will be carried off: and so, in process of time, a great part of the stomach will be emptied, and the manifolds will be so far relieved as to be able to renew its natural function.

Oil has been recommended for this purpose; but the hardened food will be more readily softened by warm water, than by any oil that can be administered. Some portion of aperient salt should be dissolved in the water, in order that purgation may be established as soon as possible, or kept moderately up when it is established; but no heating, stimulating, tonic medicine, beyond the prescribed proportion of aromatic to the purgative, should on any account be given, for it is impossible to tell what inflammatory action may be going forward in the manyplus, or to what degree the spasmodic contraction on its contents may be increased. No food should be allowed

except soft or almost fluid mashes, but the animal may be indulged in water or thin gruel without limit. Clysters can have little effect, and will only uselessly tease the animal, already sufficiently annoyed by frequent drenching.

After all, it may be doubtful whether the injury and danger produced by the distension of the manifolds with food is not sometimes brought about in a different way from that which has been hitherto imagined. This stomach has already been described (p. 288), as situated obliquely between the liver and the right sac of the rumen, and, therefore, when distended by food it will press upon the liver, and impede the circulation through the main vessel that returns the blood from the intestines to the heart, and thus cause the retention of an undue quantity of blood in the veins of the abdomen. From this will naturally or almost necessarily arise a determination of blood to the brain, and the winding up of the disease by a species of apoplexy. This, however, will not alter the opinion that has been given of the proper treatment of the disease, but will throw considerable light on the nature and causes of some of these determinations to the head, which have not hitherto been perfectly understood.

THE DISEASES OF THE ABOMASUM, OR FOURTH STOMACH.

Our knowledge of the nature, and symptoms, and treatment of these diseases is as imperfect as those of the manyplus. Concretions, and mostly of hair, are occasionally found in this stomach, which, by their pressure, must produce disease to a certain extent. Poisonous substances, received into this stomach after rumination, as is sometimes the case when the plants are fully grown, from the deficiency of acute taste in the ox, and which oftener happens when, in spring, neither their taste nor their smell is developed, produce inflammation and ulceration of the coats of the abomasum. Inflammation may and does exist from other causes, as exposure to too great heat, and the continuance of unseasonable cold and wet weather, too sudden change of food, the administration of acrid and stimulating medicines: but the practitioner can rarely distinguish them from inflammatory disease of the other stomachs, or of the intestinal canal.

So far as the symptoms can be arranged, they are nearly the following: there is fever; a full and hard pulse at the commencement, but rapidly changing its character and becoming small, very irregular, intermittent, and, at last, scarcely to be felt except at the heart. The beast is much depressed and almost always lying down, with its head turned towards its side, and its muzzle, as nearly as possible, resting on the place beneath which the fourth stomach would be found, or when standing, it is curiously stretching out its fore limbs, with its brisket almost to the ground. The inspirations are deep,

interrupted by sighing, moaning, grinding of the teeth, and occasionally by hiccup; the tongue is dry and furred, and red around its edges and at the tip; the belly generally is swelled, more so than in the distension of the rumen by food, but less so than in hoove, and, as further distinguishing the case from both, it is exceedingly tender; there is frequently distressing tenesmus, and the urine is voided with difficulty, and drop by drop. After death, the stomach exhibits much inflammation of the lining membrane, but very seldom any ulceration.

The remedies would be bleeding, purgatives, mashes, and gruel.

It is almost useless to dwell longer on this unsatisfactory portion of the subject, except to warn the practitioner against being misled by the peculiar softness of the inner lining membrane of the fourth stomach of the ox. That which would be said to be diseased condition, or softening, or even decomposition of the inner coat of the stomach in other animals, is the natural state of the abomasum in cattle.

Homeopathic treatment.—The treatment should be commenced by some doses of *aconitum*, at short intervals, after which the true specific is *arsenicum*, two doses of which are almost always sufficient. *Carbo vegetabilis* also at times renders great service.

CHAPTER XIII.

THE ANATOMY AND DISEASES OF THE SPLEEN, LIVER, AND PANCREAS.

THE SPLEEN.

The *spleen*, or *melt*, is a long, thin, dark-colored substance, situated on the left side, attached to the rumen, and between that stomach and the diaphragm. It is closely tied to the stomach by blood-vessels, and cellular texture. It is of a uniform size through its whole extent, except that it is rounded at both ends. Of its use we are, in a manner, ignorant; it has been removed without any apparent injury to digestion. Its artery is large and tortuous, and its vein is of great size, and forms a considerable portion of that which conveys the blood from the other contents of the abdomen to the liver. It is probably connected either with the functions of the liver, or with the supply of some principle essential to the blood.

It is subject to various diseases, inflammation, ulceration, increased size, tubercles, hydatids, ossification; but in the present state of cattle medicine it is impossible to state the symptoms by which the greater part of these are characterized.

The occasional seat of disease, the spleen, and which is found most especially to have suffered, is too frequently overlooked. A beast in high condition, over-driven, or placed in too luxuriant pasture, is suddenly taken ill; he staggers; his respiration becomes laborious; his mouth is covered with foam; the tongue burns; he stands with his head stretched out, laboring for breath; he moans; blood escapes from the nostrils or the anus; the disease runs its course in the space of a few hours, and the animal dies. On opening him, the vessels beneath the skin are all gorged with blood; the skin itself is injected and red; the lungs and abdominal viscera are congested with blood; the liver is gorged with it. It is inflammatory fever that has destroyed the animal; but the speen is most of all affected and disorganized—it is augmented in size, softened, its peritoneal covering torn, and blood has rushed from it and filled the belly; or the blood has oozed through the investment without any visible rupture.

In such a malady, the skill of the practitioner can be of little avail. Had the peculiar determination of disease to the spleen been discovered, it could not have been arrested; and all that can be

obtained is a lesson of wisdom; a caution to adopt a more equable and less forcing system of feeding, and the avoidance of all those causes of general inflammation in which the weakest organ suffers most, and by its disorganization, causes, or, at all events, hastens, death.

Homœopathic treatment.—At the onset, *aconitum* should be prescribed in repeated doses, which often suffices to arrest the disease. If this result be not attained, and the brown color of the tongue increases, we are to have recourse to *arsenicum*. If nervous symptoms are observed, the animal making deep inspirations, during which it shakes the entire body, *bryonia* is to be employed alternately with *aconitum*. *Nux vomica*, which is also to be alternated with *aconitum*, is indicated when the splenic region is very painful to the touch, and the animal frequently looks towards it. *Lauro-cerasus* has proved useful in a very obstinate case, where the pulse was small, the eye fixed, the head directed upward, and the animal insensible, with the exception of some convulsive movements, when the affected part was touched.

THE LIVER.

This organ is situated on the right side of the abdomen, between the manyplus and the diaphragm. It is principally supported by a duplicature of peritoneum extending from the spine; and is confined in its situation by other ligaments, or similar peritoneal duplicature connecting its separate lobes or divisions with the diaphragm. It is divided into two lobes of unequal size. The right lobe is the larger; the smaller one is comparatively diminutive.

The blood from the other contents of the abdomen, instead of flowing directly to the heart, passes through the liver. It enters by two large vessels, and is spread through every part of the liver by means of the almost innumerable branches into which these vessels divide. As it passes through the liver, a fluid is secreted from it, called the *bile*, probably a kind of excrement, the continuance of which in the blood would be injurious, but which, at the same time, answers a peculiar purpose in the process of digestion.

The bile thus secreted flows into the intestines, and enters the duodenum through an orifice, the situation of which is marked out by *h*, p. 291. It flows into the intestines as fast as it is secreted or separated from the blood; a portion of it, probably a comparatively small portion, however, is received into a reservoir, the *gall-bladder*, where it is retained until needed for the purpose of digestion. While the ox is grazing or asleep, there is no necessity for the whole of the bile to run on into the intestines, but a part of it accumulates in the gall-bladder. While it is retained there, it undergoes some change; part of the water which it contains is absorbed, and the residue becomes thickened, and more effective in its operation; and when the

animal begins to ruminate, and portions of food pass through the fourth and true stomach into the duodenum, not only is the flow of bile into the gall-bladder stopped, but, either by some mechanical pressure on that vessel which no one has yet explained, or, more probably, by the sympathy which exists among all the organs of digestion, and the influence of the great organic nerve causing the (probably) muscular coat of the vessel to contract, the bile flows out of its resorvoir, and proceeds to its ultimate destination, along with the portion which continues to run directly from the liver into the intestine, through the medium of the hepatic duct. This pear-shaped reservoir, the gall-bladder, is placed in a depression in the posterior face of the liver, and adheres to it by means of a delicate cellular texture. The construction of this vessel deserves attention. It has the same external peritoneal coat with the viscera generally ; beneath is a thicker coat, evidently composed of cellular substance, in which no muscular fibres have yet been demonstratively traced, but in which they may be well conceived to exist, and in which, doubtless, they do exist, in order to enable the gall-bladder to contract and expel its contents. The inner coat is a very singular one. It has not precisely the honeycomb cells of the reticulum in miniature, but it is divided into numerous cells of very irregular and different shapes, in the base of which, as in the cells of the reticulum, are minute follicular glands that secrete a mucous fluid to defend the internal surface of the gall-bladder from the acrimony of the bile which it contains.

INFLAMMATION OF THE LIVER.

Cattle, and especially those that are stall-fed, are subject to inflammation of the liver. This appears evident enough on examination after death, but the symptoms during life are exceedingly obscure, and not to be depended upon. An almost invariable one, however, is yellowness of the eyes and skin; but this accompanies, or is the chief characteristic of, obstruction of the biliary duct, and possibly exists without the slightest inflammation of the substance of the liver. It should also be remembered that there is scarcely any acute disease to which cattle are subject, in which the liver does not sympathize.

Bile is secreted in great abundance in a healthy state of the animal, and its secretion is very much increased under almost every intestinal disease, on account of the sympathy which exists between the liver and the other organs of digestion. The feeding too much on oil-cake will produce in most cattle a yellowness of the skin during life, and a yellow tinge of the fat and the envelopes of the muscles after death.

In addition to the common symptoms of fever, (quickness of the pulse, heaving, dryness of the muzzle, heat of the mouth and root of the horn, listless or suspended rumination,) those that would lead to the suspicion of inflammation of the liver would be, lying continually

on the right side, slight spasms on that side, or wavy motions of the skin over the region of the liver—a general fullness of the belly, but most referable to the right side, and the expression of considerable pain when pressure is made on that side. Occasionally, the animal looks round on this part, and endeavors to rest his muzzle upon it. There is usually some degree of constipation; the beast does not urinate so often or so abundantly as in health, and the urine is yellow or brown, or, in a few cases, bloody.

The proper remedies are bleeding, physic, blisters on the right side, and restricted diet, from which everything of a stimulating kind is carefully withdrawn. The most frequent causes of this complaint are blows, over-driving, the use of too stimulating food, and the sudden suppression of some cutaneous disease.

Inflammation of the liver sometimes takes on a *chronic* form. Perhaps it never assumed any great degree of intensity, or the intense inflammation was palliated, but not removed; and this state may exist for some months, or years, not characterized by any decided symptom, and but little interfering with health. Then commences induration, or hardening of a portion of the liver, or of the greater part of it, and accompanied by tubercles, vomicæ, hydatids, and the existence of the fluke-worm in the ducts.

The difficulty of detecting this chronic inflammation during the life of the animal throws much obscurity on the mode of treating it. Permanent yellowness of the skin—a constant but not violent cough—and the want of, or the slowness in acquiring, condition beyond a certain degree, would be the symptoms of most frequent occurrence. The treatment should consist of the frequent exhibition of gentle purgatives, with a more than the usual quantity of the aromatic (six ounces of Epsom salts, and half an ounce of ginger,) and the food should be green, succulent, and as little stimulating as possible. Mercury, to which recourse is usually had, when a similar complaint is suspected to exist in the human subject, would be worse than thrown away upon cattle. In the majority of cases in which it is used for the diseases of cattle, it produces decidedly injurious effect.

Homœopathic treatment.—The principal remedies are *aconitum* at first, then *nux vomica* alternately with *mercurius vivus*. *Murias magnesiæ* also deserves to be specially recommended. If the symptoms of jaundice predominate, *chamomilla* and *mercurius vivus* should be employed, and when hard fæces predominate, *nux vomica* and *bryonia*. *Lycopodium* is useful in chronic cases, in the same manner as when there are colics which disappear as long as the animal remains lying down on the left side.

HÆMORRHAGE FROM THE LIVER.

It has already been observed that when these animals are turned

on the fresh grass in the spring, or the fog in autumn, they are subject to various plethoric or inflammatory complaints. The ravages of apoplexy and inflammatory fever at these times have been described. An undue quantity of blood rapidly formed oppresses the whole system, and, from some cause of determination to it, a particular organ or part becomes violently congested or inflamed, and the animal is destroyed. The liver occasionally suffers in this way.

A heifer died, and on opening the belly, the cavity was found to contain nearly six gallons of blood, which had escaped from a rupture, two inches in length, in one of the lobes of the liver.

Certain beasts have died of some obscure disease; it has been rapid in its progress, and not characterized by any symptoms of great inflammation, or the inflammatory symptoms, if such had appeared, have subsided, and those of evident and extreme exhaustion have succeeded. The pulse has been feeble, or almost indistinct—the mouth has been cold—the membranes of the mouth and nose pale. The breathing has been accelerated, and the weakness extreme. After death, the substance of the liver has been found softened; it has broken on the slightest handling; it may be washed away, and the various vessels which permeate it exposed: the peritoneal covering has been loosened—elevated from the liver—and the interval has been occupied by a clot of blood; and from some rupture in this covering, which has partaken of the softening of the viscus itself, a quantity of blood has been poured out; or it has oozed through the covering, and partially or almost entirely filled the cavity of the abdomen.

In such a case, the resources of medical art would be powerless; but every instance of hæmorrhage from the liver should be regarded as a warning against the adoption of too forcing a system of fattening, especially in young beasts, and in the spring or fall of the year.

JAUNDICE, OR THE YELLOWS.

There are few diseases to which cattle are so frequently subject, or which are so difficult to treat, as *jaundice*, commonly known by the appropriate name of *the yellows*. It is characterized by a yellow color of the eyes, the skin generally, and the urine. Its appearance is sometimes sudden; at other times the yellow tint gradually appears and deepens. In some cases it seems to be attended, for a while, by little pain or inconvenience, or impairment of condition; in others, its commencement is announced by an evident state of general irritation and fever, and particularly by quickness and hardness of pulse, heaving of the flanks, excessive thirst, and the suspension of rumination; to these rapidly succeed depression of spirits, and loss of appetite, strength, and condition. The animals can scarcely be induced to move, or they separate themselves from the herd, and

retiring to the fence, either slowly pace along the side of it, or stand hour after hour, listless and half unconscious. Not only the skin, but the very hair, gradually becomes yellow; a scaly eruption appears, attended by extreme itching, and sometimes degenerating into the worst species of mange. It is seldom, indeed, that bad mange appears among cattle without being accompanied by a yellow skin; and the cutaneous eruption was probably caused by the presence and constant excretion of bile irritating the exhalent vessels of the skin. A state of costiveness usually accompanies the yellow skin, at least in the early period of the disease, although diarrhœa, which no astringents will subdue, may afterwards appear, and, in fact, will generally wind up the affair, and carry the patient off. Jaundice cannot long exist without being accompanied by general impairment of health and loss of condition. Cows are particularly subject to it in spring and autumn. The milk soon shares in the yellowness of the other secretions, and occasionally acquires an unpleasant and bitter taste.

The usual cause of jaundice is obstruction of the passage of the bile from the gall-bladder into the duodenum. This obstruction is effected in various ways; but most frequently by biliary concretions, calculi, or gall-stones. During the continuance of the bile in the gall-bladder, a certain portion of the water which it contains is removed by the process of absorption; the residue becomes proportionably thickened, and the most solid parts are either precipitated, or form themselves into hard masses. Biliary calculi are not unfrequently found in the gall-bladder of cattle, of varying size, from that of a pin's head to a large walnut. Their form indicates that they were composed by some process of crystallization; they are round, with concentric circles, or conical, or assuming in a rude way the form of a cube, or a pentagon, or hexagon. There is usually some central portion of harder bile round which the rest is collected. They are of less specific gravity than the bile, and even than water, and are found swimming in the gall-bladder. They are composed of the yellow matter of the bile, with a portion of mucus holding it together. It is insoluble in water and alcohol, but it readily diffuses itself in a solution of potash.

So far as can be observed, the presence of these calculi in the gall-bladder does not inconvenience the animal, or interfere with health, for they are found in great numbers of slaughtered oxen. At all events, there are no recognized symptoms by which their presence can be detected, or even suspected. In some cases the writer of this work has detected more than a hundred small calculi in the bladder of one ox.

Sometimes, however, they enter the duct (the cystic) which conveys the bile to the intestines. They are likely to do this on account of their swimming on the surface of the fluid which the gall-bladder

contains. The cystic duct is large at its union with the bladder; it is a continuation of the neck of the bladder; and the gall-stone may be easily pressed into the commencement of the tube: but it has scarcely entered it before its passage is obstructed by the folds of the inner coat of of the duct. These assume a semilunar form, with the edges projecting toward the bladder, and they act as partial valves, retarding the progress of the bile, so that it may not be all pressed out at once, but gradually escape as the process of digestion may require.

The gall-stone being thus impacted, violent spasmodic action takes place in the muscles of the duct, occasioned by the irritation of its continued pressure. It is fortunate, however, that, although the muscles of these ducts act with some power, the obstruction is usually with no great difficulty overcome. The duct distends; as it distends, these valvular folds lie closer to the sides, and no longer oppose the passage of the calculus, which is pressed on until it reaches the common duct. The caliber of this tube is larger, and, unless the calculus is of considerable bulk, no farther difficulty occurs until it reaches the opening into the duodenum, which being situated in the centre of a muscular prominence, acting as a valve, and preventing the passege of all matters whether fluid or solid from the intestine into the ducts, a new difficulty is opposed to the progress of the gall-stones, and there is some return of pain, and in a few cases the pain is evidently more intense than in the early stage. At length this sphincter muscle of the duodenum dilates; the calculus enters the intestinal canal; the pain ceases, and the natural color of the skin returns. In this species of jaundice, we have, in addition to the yellow skin, the heaving of the flanks, the hard concentrated pulse, the diminished appetite, the insatiable thirst, and the other symptoms of fever. Then, too, we have the alternate coldness and heat of the ears, the roughness of the coat, the urine becoming first of a transparent yellow, and then opaque red, saffron-colored, or brown, and the sediment brown. The bowels are constipated, the fæces seldom evacuated, and, when appearing, are hard and black.

Bleeding is now clealy indicated, and that until the animal becomes faint. During this partial sympathy, the muscles of the duct may cease their spasmodic constriction, and the calculus may pass on. To this should be added powerful purgation, consisting of doses of a pound and a half each of Epsom salts, or of a pound of the salts, with ten grains of the Croton Tiglii; the medicine being repeated once in six hours, until purging is produced. Mashes should be given, to hasten and increase the action of the physic, and the beast should, if possible, be turned out to grass during the day, and taken up at night. Opium or digitalis, and particularly the latter, may be given, in doses of half a drachm of either, with a view to

allay the violent constriction of the duct. From the knowledge that biliary concretions dissolve in a solution of potash, considerable quantities of nitrate and acetate of potash have been given, but with doubtful success. Ether, hydrochlorate of ammonia, potash, and soda, have also been fruitlessly administered for the same purpose.

Another mechanical cause of jaundice may be the obstruction formed by the *fasciola* or *fluke-worm*. This singular parasite, resembling in form a little sole, and of the natural history of which, or of the changes that it has undergone, or may undergo, nothing is known, is found in the livers of cattle, and especially of those that are bred in low and marshy situations. They accompany almost every chronic disease of the liver, and often exist in the healthy animal. They inhabit the ducts into which the bile is poured from the smaller vessels of the liver—they are swimming in the bile, and said to be generally found working their way against the course of that fluid

There is no case on record in which it has been proved by examination after death that the fluke-worm has mechanically obstructed the passage of the bile, and thus caused both the yellowness and the spasm, yet it can easily be imagined that this will sometimes occur. There are no peculiar symptoms to indicate the existence of these worms, for they have never been voided from the mouth or the anus:—to the first, there would be a mechanical impediment from the construction of both the lower and upper orifices of the stomach; and the digestive process going on through the whole of the intestinal canal would render the latter improbable, if not impossible. Their presence could only be guessed at from the nature of the pasture, or from their having been found in other beasts of the same herd.

The same means would be adopted as in supposed obstruction by a calculus, but with this probable difference, that the obstruction would be more easily and quickly removed.

Of the other species of jaundice in which the attack is more gradual, and apparently unconnected with pain, and in which the symptoms are weakness, listlessness, œdematous swellings, high-colored urine, hardened excrement, declining condition, and occasional death, anatomical observation has discovered various causes. The state of the liver itself will sometimes account for every symptom. It may labor under chronic inflammation, without disorganization, and the secretion of bile will be considerably increased, and produced more rapidly than the ducts can carry it off, or than it can be disposed of in the process of digestion, and it would lurk in the intestines, and be taken up by the absorbents and carried into the circulation. At other times the diseased state of the liver prevents the escape of the bile, whether in its natural or even diminished quantity; thus, general enlargement of the substance of the liver will press upon and partially close the biliary ducts—tubercles, or

other tumors in the liver will effect the same thing. Inflammation may exist in the ducts themselves. They may become thickened or ulcerated, and thus cease to give passage to the bile, which will then be taken up by the absorbents of the liver, or mechanically forced back upon the vessels whence it was secreted. These are occasional causes of jaundice; and when they exist it will not be wondered at that the complaint is obstinate, and too often fatal.

Sometimes the source of the evil may exist in the duodenum. It may be inflamed or ulcerated, or thickened, and so the opening from the biliary duct into the intestine may be closed: or the mucus which may be secreted in the duodenum may be too abundant, or of too viscid a character, and thus also the orifice may be mechanically obstructed.

What symptom will indicate to the practitioner which of these morbid states of the liver or its ducts, or if the first intestine, is the cause of the disease? or if it did, what means could he adopt in such a case with the hope of ultimate success? The treatment of confirmed jaundice is a thankless and disheartening business. The practitioner, however, must look carefully and anxiously to the symptoms, and be guided by them. There is no general rule to direct him here. If there is evident fever, he must bleed, and regulate his abstraction of blood by the apparent degree of fever. In every case but that of diarrhœa, and at the commencement of that, he must administer purgatives—in large doses when fever is present, or in somewhat smaller quantities, but more frequently repeated, when constipation is observed; and in doses still smaller, but yet sufficient to excite a moderate and yet continued purgative action, when neither fever nor constipation exists. Considering, however, the natural temperament of cattle, the purgative should be accompanied by a more than usual quantity of the aromatic, unless the degree of fever should plainly forbid it. There are few things respecting which veterinary practitioners differ more than the kind of purgative that should be administered in this case. Some, who are usually partial to the Epsom or Glauber's salts, here prefer the aloes.

It may not, perhaps, be quite a matter of indifference what purgative is administered. The Epsom salts here, as in other cases, is the safest, the most to be depended upon, and the most effective: but the secret of treating jaundice, not with the almost invariable success of which some speak, but with the best prospect of doing good, is by the repetition of mild purgatives, accompanied, and their power increased, and the digestive powers of the animal roused, and his strength supported by the addition of aromatics and stomachics, in such doses as the slight degree, or the absence, of fever may indicate. The author certainly cannot confirm by his testimony the opinion of the comparative ease with which the complaint may be removed: he has not only found it to be one of the most common

affections of the liver, but one of the most untractable and fatal; and this from the insidious manner in which it proceeds until it has fixed itself on the constitution beyond the power of medicine to remove it. The following short directions comprise all that can be done :—subdue the inflammation or fever by bleeding and physic ;—keep the bowels afterwards under the mild but evident influence of purgative medicine ;—add aromatics and stomachics to the medicine almost from the beginning; to these, if the strength and condition of the animal should appear to be wasting, add tonics—the gentian root will stand at the head of them ;—and lastly, when the disease has been apparently subdued, a few tonic drinks will restore the appetite, prepare for the regaining of condition, and re-establish the secretion of milk.

Homœopathic treatment.—The chief remedies to be employed are: *mercurius vivus, nux vomica,* and *chamomilla. Arsenicum* is employed, if rumination be suppressed ; and *lycopodium,* if there be cough. *Mercurius solubilis* is, it is said, specific when the stools are whitish, as sometimes happens in acute jaundice. *Sulphur* has more than once sufficed to remove the disease.

THE PANCREAS.

This is a long, irregularly formed, flattened gland, confined to the left side of the abdomen, in the neighborhood of, but not adhering to, the fourth stomach, and mostly connected with the duodenum and colon, by mesenteric attachments. It is of a pale red color, and evidently composed of an accumulation of small glands, resembling salivary ones : each of them is a secreting gland, and a duct proceeds from each ;—these unite and form one common canal, which takes its course towards the duodenum, unites itself with the biliary duct, already described, and enters with it into the duodenum, as represented at *h,* in the cut in p. 291.

This gland appears to be subject to very few diseases, and the symptoms of these diseases are, in the present state of knowledge of the pathology of cattle, very imperfectly known. In a few instances, enlargement of the pancreas has been found after death ; at other times, there have been inflammation, tubercles, a schirrous induration, and considerable abscess ; but there were no previous symptoms to lead to the suspicion that this gland was the principal seat of disease, and there were other morbid appearances in the stomachs or intestines, to indicate sufficient cause of death without reference to the state of the pancreas. This is a subject which deserves the attention of the veterinary surgeon, and on which no one has yet ventured to write.

We are now prepared to follow the passage of the food from the fourth stomach into the intestinal canal.

CHAPTER XIV.

THE ANATOMY AND DISEASES OF THE INTESTINES.

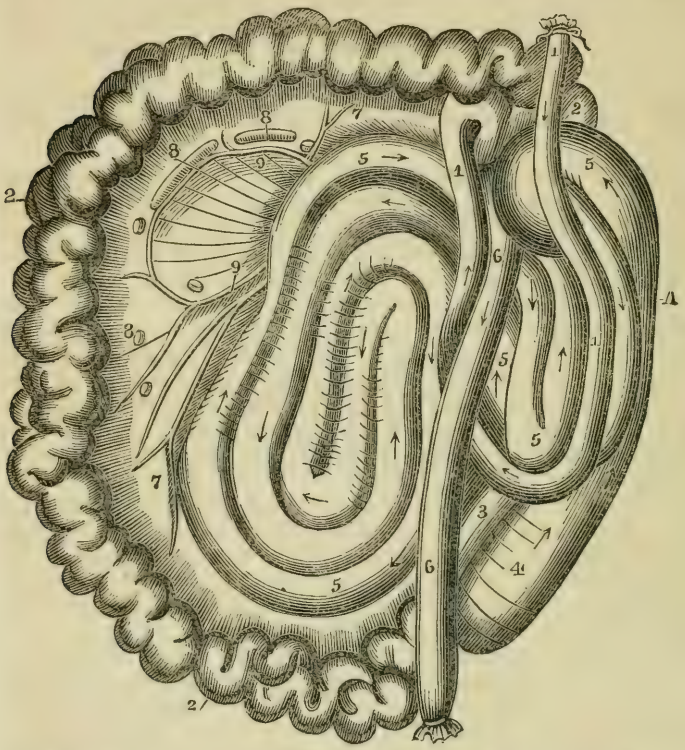
In cattle, the enormous development of the rumen, occupying nearly three-fourths of the abdominal cavity, leaves but little room for bulky intestines; the bowels are therefore diminished in size, in order that they may be more rapidly packed wherever room can be found for them.

The larger intestines, particularly the colon and cæcum, have no cellated structure, and, consequently, the food will pass through them with great rapidity. Lest this, however, should prevent the abstraction of all the nutriment which it contains, and thus interfere with the destiny of cattle—the furnishing of the human being with food while they are living and after they are dead—the intestinal canal is greatly prolonged. The intestines of cattle are twenty-two times as long as his body.

It will be remarked (*g*, p. 291, and *fig.* 1, on next page,) that the duodenum is, at its commencement from the stomach, little larger than the jejunum and ileum, which are prolongations from it. In consequence of the maceration of the food in the rumen, the double mastication, and the mechanism of the manyplus, by means of which every fibrous particle is seized and ground down, the food is nearly dissolved before it enters the fourth stomach; it is easily completed there, and the duodenum has nothing to do of this nature. On this account, the duodenum of cattle is little larger than the small intestines which succeed to it.

The duodenum and all the intestines have, like the stomachs, three coats. The outer one is the peritoneum, or the membrane by which all the contents of the belly are invested; by which also they are all confined in their natural situations, and by the smoothness and moisture of which, all injurious friction and concussions are avoided. The second is the muscular coat, supplied by the motor organic nerves, and by means of the contraction of which the food is propelled along the intestinal canal in the process of healthy digestion, or hastened when those muscles are made to contract more rapidly and violently under the influence of irritation, whether refer-

able to disease or to some purgative drug. The inner coat is a mucous one, thickly studded with minute glands, which, in a state of health, secrete sufficient mucous fluid to lubricate the passage; and, under the stimulus of a purgative, throw out a fluid increased in quantity, and of a more aqueous character, and in which the contents of the intestines are softened and involved and carried away.



1. The Duodenum.
2. The Jejunum.
3. The Ileum.
4. The Cæcum.
5. The Colon.
6. The Rectum.
7. The Mesentery.
8. Mesenteric Glands.
9. Blood-vessels.

THE DUODENUM.

On this coat likewise open the mouths of innumerable vessels—the lacteal absorbents—which imbibe or take up the nutritive portion of the food. These vessels ramify across the mesentery, and convey this nutriment to a common duct that passes along it, and by means of which it is carried into the great veins in the neighborhood

of the heart, where it is mixed with the venous blood returned from every part. By the power of the heart it is propelled through the lungs, where it is purified and vitalized: and having been returned to this organ it is driven through other vessels all over the frame, and bestows nutriment and life on every part.

The food, in a state of perfect solution, and under the name of chyme, is forced on by the muscular coat of the fourth stomach into the duodenum, where another change immediately commences. The food is separated into two distinct portions or principles—that which is nutritive or capable of being imbibed by the lacteals—a white fluid called chyle—and that which is either innutritive, or which they reject, and which is propelled along the intestines and finally evacuated.

There has been much dispute as to the manner in which this separation is effected. The chyme that has been formed by the agency of the gastric juice may contain in itself a tendency to this separation, or precipitation of the excrementitious part; or this may be effected by some fluid secreted from the mucous coat of the duodenum; or the bile and the pancreatic juice may be the main agents in producing the change.

Ten or twelve inches down the duodenum, as may be seen at *h*, p. 291, two ducts penetrate the coats of that intestine, and pour into it the fluid secreted by the pancreas and liver. It would seem likely, from the distance from the stomach at which these fluids enter, that some change had already taken place in the contents of the duodenum, which was to be perfected by means of these auxiliaries. The separation or precipitation is more rapidly and effectually made; while the bile also has some stimulating effect on the coats of the stomach, urging the exhalents and the absorbents, and the muscles of the intestines, to stronger and more effectual action; and the pancreatic juice may dilute the biliary secretion, and shield the intestine from its occasional too great acrimony.

While, however, the bile is thus acting in promoting healthy digestion, (and no animals afford more frequent illustration of the connection between the biliary secretion and the digestive process than cattle do,) the true notion of it is perhaps, that it is an excrementitious substance, containing properties that would be noxious to the constitution, but, as in most of the contrivances of nature, the mode of its evacuation answers another and a salutary purpose.

The duodenum terminates in the jejunum, but there is no assignable point where the one can be said to terminate and the other begin.

THE JEJUNUM AND ILEUM.

These intestines, together with the duodenum, the cæcum, and a portion of the colon, will be seen (in the cut p. 330, at *figs.* 2 and 3,)

to be united together, and enfolded in one common expansion of the mesentery. They lie on the right side of the belly, occupying the flank, and resting upon the right portion of the rumen. The jejunum and the ileum constitute the border of this mesenteric expansion, and are disposed in the form of numerous spiral convolutions. If they were unfolded, the length of these intestines would, in an ox of common size, amount to more than one hundred feet. This length of small intestine is designed to compensate for the want of development and of cells in the larger ones. The food is detained by the length of the passage, and also by the construction of the convolutions. The principal absorption of chyle takes place in them.

THE CÆCUM.

It describes a considerable arch (see *fig.* 4, p. 330,) the superior extremity of which is fixed to the portion of mesentery common to it and the small intestines, while the inferior portion floats loose in the abdomen, and is prolonged into the pelvic cavity, where it has a rounded termination. The portion of food that can enter into it is small, and cannot be detained long there, because there are no longitudinal bands to pucker the intestine into numerous and deep cells; but the contents of the cæcum have the character of being more fluid than in any other part of the intestinal canal. The length of the cæcum seldom exceeds a yard.

THE COLON.

This intestine is evidently divisible into two parts, (see *fig.* 5. p. 330;) the one smaller than the cæcum is supported by the common mesentery; the other floats loose in the belly, and forms part of the second mass of intestines. It has convolutions, but is destitute of muscular bands. It is less than the cæcum, but combined with the next and the last intestine, the rectum, it measures more than thirty-three feet. The want of mechanical obstruction to the passage of the food is thus made up by the increased length of the viscera. In the colon, the process of digestion may be considered to be in a manner terminated, and all that remains is fæculent matter, that continues to be urged on in order to be expelled.

THE RECTUM.

This intestine, so called from the straight course which it runs, terminates the digestive canal. It has no longitudinal bands, for it contains little beside the excrement that is to be discharged, or that should least of all be detained. The lacteal absorbents may still be traced in this intestine, but it is probable that very little nutritive matter is taken up, although, from the occasional hardened state of the dung, it is possible that much fluid may be carried off.

A circular muscle, the sphincter, is always in action at the termination of the rectum, to prevent its contents from being involuntarily discharged. Its power is just sufficient for the purpose; and it readily yields, when by the pressure of the abdominal muscles and the diaphragm, the excrement is forced against it, in the voluntary efforts of the animal.

The contents of the rectum in cattle are semi-fluid—their nutritive qualities are nearly exhausted, and they are of very inferior value for agricultural purposes.

THE DISEASES OF THE INTESTINES.

These are too numerous, and destroy too many of our cattle. Those which belong to the membranes that invest or line the intestines, and that are referable to the greater part, or the whole, of their extent, will with most convenience first come under consideration. Those which affect only particular viscera, or parts of them, will naturally follow.

ENLARGEMENT OF THE MESENTERIC GLANDS.

It has been stated that there are numerous vessels, termed lacteals, opening on the inner coat of the intestines, in order to convey the chyle to the thoracic duct, so that it may mingle with and supply the waste of the blood. These little vessels, ere they reach the main trunk, pass through a glandular body, in which some unknown change is probably effected in the chyle. Some of these mesenteric glands are represented at *fig.* 8, p. 330. These glands occasionally become unnaturally enlarged, and then, whether from the abstraction of so much nutriment, in order to contribute to this enlargement, or from the unknown change not taking place in the chyle before it mingles with the blood, or from the constitutional disturbance which the presence of such a body in the abdomen must produce, the animal ceases to thrive, his belly becomes enlarged, cough and consumption appear, and he gradually wastes away and dies. On examination after death, some of the mesenteric glands are of unusual bulk, and occasionally have grown to an enormous size.

A cow having an internal tumor, showing on the right side, died. On opening the abdomen, the first thing that presented itself, filling the iliac region, was a large mesenteric gland, of irregular form, weighing 160 pounds. On making a section through it, its appearance was chiefly that of a schirrous deposit. The mesenteric glands generally were unhealthy, and many of them were schirrous. This case is a valuable one; it is the only one on record of schirrous enlargement of the mesenteric glands of the ox; but the recollection of every practitioner will furnish him with not a few instances of these tumors unexpectedly presenting themselves on examination of the abdomen. They have been found chiefly in young beasts that had been bred too much in

and in, or that had been weakly from other causes, and particularly in those that had been subject to chronic cough, associated with tubercles in the lungs. In low and damp situations these tumors have been found on the mesentery of cattle that have been long unthrifty and out of condition, and that have at length died apparently in consequence of some other disease.

The association, however, with these diseases has differed so materially in different cases, and the symptoms have been so obscure, or so much resembling those of various and almost opposite complaints, that they have not yet been satisfactorily classed and arranged.

The treatment of these mesenteric enlargements, when they are suspected and pretty well ascertained, would be a course of mild purgatives, mingled with tonics, (the Epsom salts with gentian and ginger, a dose sufficient to keep the bowels gently open being administered every morning,) with the exhibition of from six to ten grains of the hydriodate of potash, at noon and night, and the removal of the animal to good and dry pasture.

INFLAMMATION OF THE BOWELS.

Of this malady there are two species: the first is inflammation of the external coat of the intestines, accompanied by considerable fever, and usually by costiveness; the second is that of the internal or mucous coat, and generally attended by violent purging.

The first of these, designated by the term Enteritis, is, in most cases, sudden in its attack. Beasts of middle age—strong—in good condition, and particularly working cattle, are most subject to it. Calves, old beasts, and milch cows are comparatively exempt from it. The disease is most frequent in hot weather, and after long-continued drought.

The beast, that on the preceding day seemed to be in perfect health, is observed to be dull—depressed—his muzzle dry—his hair rough;—he shrinks when his loins are pressed upon, and his belly seems to be enlarged on the left side. To these symptoms speedily succeed disinclination to move—weakness of the hind limbs—trembling of them—staggering—heaving of the flanks—protrusion of the head—redness of the eyes—heat of the mouth and ears and roots of the horns, and a small, but rapid pulse, generally varying from 60 to 80 beats in a minute. Rumination has now ceased; the appetite is lost; the fæces are rarely voided, and are hard and covered with a glazy mucus, and that mucus is sometimes streaked with blood;—the animal also moans with intensity of pain.

The symptoms rapidly increase; the patient becomes more depressed; the pulse more feeble; the moaning incessant, and the beast is continually down. He becomes half unconscious, and is evidently half-blind; the mouth is filled with foam, and the tongue is covered with a browish yellow deposit. There is grinding of the

teeth, and difficulty in the swallowing of liquids; a tucked appearance of the belly, mingling with the enlargement of the left flank—and the whole of the belly is exceedingly tender. Until he is too weak to raise himself, he is exceedingly restless, lying down, and immediately getting up again, and with convulsive movements of the muscles of the neck and extremities. The evacuation of the fæces is entirely suppressed, or a little stream of liquid excrement forces a passage through the hardened mass by which the rectum is distended, and that which is voided has an exceedingly fetid and putrid smell. This symptom is characteristic. The person who is accustomed to cattle says that the beast is *fardel-bound* or *sapped*, but he often mistakes the nature of the case, and fancies that diarrhœa instead of costiveness exists. The urine becomes thick and oily and brown, and has a peculiarly disagreeable and penetrating smell. As the disease proceeds, the weakness and suffering increase, until the animal dies, sometimes exhausted, but mostly in convulsions, and frequently discharging a bloody fetid fluid from the mouth, the nose, and the anus.

Sometimes, when the disease has not been attacked with sufficient energy, and often in despite of the most skillful treatment, other symptoms appear. The animal seems to amend; the pulse is slower and more developed—rumination returns—the patient eats a little—the enlargement of the flanks subsides—the excrement, whether hard or fluid, is more abundantly discharged: but the beast is sadly thin—he is daily losing ground—his coat stares—the hair is easily detached—the skin clings to the bones—he is sometimes better, and sometimes worse, until violent inflammation again suddenly comes on, and he is speedily carried off.

On examination after death, the first thing that presents itself is the engorgement of the sub-cutaneous vessels with black and coagulated blood, and the discoloration of the muscles, softened in their consistence and becoming putrid. The abdomen exhibits the effusion of a great quantity of bloody fluid; eight, ten, and twelve gallons have been taken from it. The peritoneum is inflamed—almost universally so;—there are black and gangrenous patches in various parts, and on others there are deposits of flaky matter, curiously formed, and often curiously spotted. The liver is enlarged, and its substance easily torn; the rumen is distended with food, generally dry, and its lining membrane inflamed and injected, and of a purple or blue tint; the reticulum does not escape the inflammatory action; the manyplus is filled with dry and hard layers, which cannot be detached without difficulty from the mucous membrane of that stomach; the fourth stomach is highly inflamed, with patches of a more intense character, and its contents are liquid and bloody, particularly towards the pyloric orifice. The small intestines contain many spots of ulceration, the lining membrane is everywhere inflamed, and they are filled with an

adhesive or bloody mucous fluid; the larger intestines are even more inflamed; they exhibit more extensive ulceration, and contain many clots of effused blood. The rectum is ulcerated and gangrenous from end to end.

There is usually considerable effusion in the chest; the coverings of the lungs are inflamed; the bag of the heart more so; the substance of the lungs is sometimes emphysematous, and at other times gorged with blood, and the heart is marked with black spots outwardly, and in its cavities. The lining membrane of all the air-passages is of a red brown color; the larynx and the pharynx are intensely red, and so is the membrane of the gullet.

Of the causes of this disease it is difficult to speak. It seems occasionally to be epidemic, for several instances of it occur, of the same character, and in the same district.

When isolated cases occur, they may generally be attributed to mismanagement. Exposure to cold, or the drinking of cold water when heated with work; too hard work in sultry weather; the use of water stagnant, impure, or containing any considerable quantity of metallic salts; the sudden revulsion of some cutaneous eruption; the crowding of animals into a confined place; too luxuriant and stimulating food generally; and the mildewed and unwholesome food on which cattle are too often kept, are fruitful sources of this complaint.

Homœopathic treatment.—*Aconitum* is to be given in doses repeated every fifteen or twenty minutes, until the most prominent symptoms of the inflammation have disappeared. If this end be not attained after some hours, or if, notwithstanding a perceptible improvement, pain still remains, *arsenicum* is to be given. The medicine alternately with *aconitum*, has sometimes, it is said, produced good effects. It is particularly indicated when the disease has been occasioned by cold drinks, or by improper food and disturbance of digestion. When *aconitum* and *arsenicum* fail, we must have recourse to *carbo vegetabilis* and *rhus toxicodendron*.

WOOD-EVIL, MOOR-ILL, PANTAS.

These are but varieties of the same disease, frequently produced, as the first name would import, by browsing on the young buds of trees, and particularly on those of the ash and the oak. These buds are tempting to cattle at the commencement of the spring, but they are of too acrid and stimulating a character to be eaten with impunity in any considerable quantities. Heat of the mouth and skin —redness of the membranes—thirst—obstinate constipation—hardness of the little fæces that are expelled—the covering of them with mucus and blood—difficulty of voiding urine, and its red color and penetrating odor—colicky pains—depression—are the characteristic symptoms of this disease.

Some veterinarians give the name of wood-evil to complaints allied

to rheumatism, or being essentially rheumatic; others consider it to be a disease of debility, looking to the consequence of inflammation, and not to the inflammation itself. If any distinction were drawn between wood-evil and enteritis in cattle, it would be, that although in wood-evil there seems to be more affection of the head, and the animal appears now and then as if it were rabid, there is not so much intestinal inflammation, and the disease dose not so speedily run its course. Wood-evil may last from twelve to twenty days.

The prognosis, or expectation of the termination of the disease, is always unfavorable when after a certain time much fever comes on, or the costiveness will not give way, or the urine is thick or bloody, or the disease attains its full intensity in the space of a few days. Then, instead of terminating in resolution, the inflammation runs on to gangrene; all the acute symptoms suddenly disappear, and death is not far distant. On the other hand, the result will be favorable when the disease does not reach that degree of intensity of which it is capable—when, after a few days, the symptoms gradually disappear, and the animal regains his former habits, and the excrement resumes its natural form and consistence.

The history that has been given of this disease will leave little doubt respecting the course of treatment that should be pursued. A malady of so intensely an inflammatory character should be met by prompt and decisive measures: and to them it will, in its early stage, generally yield. Nothing is so easy as to give relief to a sapped or fardel-bound beast, before he begins to heave at the flanks or ceases to ruminate; but quickness of breathing, and heat of the mouth, and evident fever, being once established, the animal will probably be lost.

The patient should be bled. If it be simple costiveness without fever, the abstraction of six or eight quarts of blood may suffice; but if the symptoms of inflammation cannot be misunderstood, the measure of the bleeding will be the quantity that the animal will lose before he staggers or falls. Purgatives should follow—the first dose being of the full strength, and assisted by quickly repeated ones, until quick purging is produced. Hot water, or blisters, should be applied to the belly, and the food of the beast should be restricted to gruel and mashes. This will, in most cases, include the whole of the treatment.

If other spmptoms should arise, or other parts appear to be involved, the practitioner will change his mode of proceeding accordingly; but he will be cautious how he gives aromatics or tonics, until he is convinced that the state of fever has passed over, and circumstances indicate the approach of debility and of typhus fever.

Homœopathic treatment.—Ipecacuanha and *veratrum*, alternately, every quarter of an hour, are the means by which this disease has been cured, which, in general, proceeds with great rapidity. *Aconitum* and *arsenicum* might be most properly administered.

DIARRHŒA AND DYSENTERY.

The distinction between these two diseases, and it is of essential importance to observe it in the treatment of cattle, is, that diarrhœa consists in the evacuation of fæcal matter, in an undue quantity, and more than naturally liquid form. In dysentery, more or less mucus, or mucus and blood combined, mingles with fæces.

The frequent and abundant evacuation of fæcal matter, whether with or without mucus, may be considered either as simple, or connected with other diseases. In its former state it will be the subject of present consideration, and may be regarded as acute or chronic. Acute diarrhœa may be produced by various causes;—the abuse of purgatives, by their being administered in too active a form —feeding on certain poisonous plants—sudden change of food, generally from dry to green aliment, but occasionally from green to dry —excess of food—the drinking of bad water—or by some humid and unhealthy state of the atmosphere. From the last cause it usually assumes an epizootic character, particularly in autumn. A great many cows in a certain district are suddenly attacked by it, although there is no reason to suspect that it is in the slightest degree contagious.

Calves and milch cows are far more subject to this species of intestinal inflammation than are full grown or working oxen.

The proper treatment of acute *diarrhœa* will consist in the administration of a mild purgative, in order to carry off any source of irritation in the intestinal canal; the abstraction of blood, if there be any degree of fever, and in proportion to that fever; and then the exhibition of alkalies and astringents. The most effectual medicines are prepared chalk, opium, catechu, and ginger, in the proportions of one ounce of the first, one drachm of the second, four drachms of the third, and two of the last, in each dose, and to be administered in thick gruel.

This will generally be successful: but, occasionally, these acute cases of diarrhœa are obstinate and fatal; and too often it happens that what has been represented to the practitioner as a sudden attack turns out to be the winding up of some chronic disease, and he does not discover the mistake until it is too late.

Diarrhœa is not always to be considered as a disease. It is often a salutary effort of nature to get rid of that which would be injurious; or it is a somewhat too great action of certain of the digestive organs, which soon quiet down again to their natural and healthy function. An occasional lax state of the bowels in calves is known to be favorable to the acquirement of fat; and a beast that is well purged on being first turned on spring-grass or turnips, thrives far more rapidly than another that is little, or not at all, affected by the change. Diarrhœa, in some critical stages of disease,

is to be hailed as the precursor of health, rather than feared as the attack of a new malady: it should be so in pneumonia, red water, and puerperal fever. All that is then to be done is to prevent its becoming so violent as to depress the vital energies. Diarrhœa may assume a chronic form, with greater or less severity, and producing loss of condition and debility; it may be prolonged for many a month, and even for years, and at length terminate fatally. This is often the case with cows that have been drained of their milk and badly kept. The diarrhœa of calves will be considered when the diseases of those animals come under notice.

The treatment of chronic diarrhœa is difficult and unsatisfactory. Purgatives cannot be dispensed with, but they must be administered with considerable caution. Both the medicine and the quantity should be well considered, for if the aperient be not strong enough, the disorder will be increased and prolonged; and if it be too strong, both these effects will be produced to a greater extent, and fatal inflammation and superpurgation may ensue. Castor oil will be the safest, and the most effectual medicine, in doses from a pint to a quart: and a small quantity, ten grains, of powdered opium, will not interfere with the aperient quality of the oil, while it may allay irritation. After two doses of the oil have been given, the powder already recommended may be tried, but with a double quantity of ginger, and half a drachm of powdered gentian. After a while, a drachm of Dover's powder may be given, morning and night; and, that also ceasing to have effect, the first powder may again be administered. Alum whey is often of considerable service. If the animal be turned out, it should be on the driest pasture, but it will be better for her to be kept up with plenty of hay, and gruel to drink.

Homœopathic treatment—The cure of diarrhœa is effected by different means. In the diarrhœa which bursts out suddenly, or the acute form, we should commence with a couple of doses of *aconitum*, at short intervals; after which, in most cases, *arsenicum* and *ipecacuanha* are very effectual. The diarrhœa brought on by cold often yields to *aconitum* alone, as that resulting from any irregularity in diet yields to *arsenic*. If in the latter case there be also loss of appetite, and if *arsenic* does not effect a cure, *pulsatilla* should be given, or, when there is an absolute repugnance to food, *antimonium crudum*, especially when the diarrhœa alternates periodically with constipation. If there be frequent dejections without pain, we have resource to *rheum*. *Asarum* is useful, if the evacuations are fluid, and sometimes mixed with bloody mucus.

In the treatment of chronic diarrhœa, beside *china*, *sulphur*, *chamomilla*, and *veratrum*, which have been found useful more than once, we should employ *acidum phosphoricum*, *bryonia*, *calcarea acetica*, *dulcamara*, *magnesia*, *carbonica*, *petroleum* and *phosphorus*. Diarrhœa is

usually accompanied with a general morbid state, with respect to which we are to choose, among these several means, that which suits best. *Sulphur* and *arsenicum* are the principal remedies for diarrhœa in calves.

It is, however, with DYSENTERY that the practitioner is most loth to cope—a disease that destroys thousands of our cattle. This also may be either acute or *chronic*. Its causes are too often buried in obscurity, and its premonitory symptoms are disregarded or unknown. There appears to be a strong predisposition in cattle to take on this disease. It seems to be the winding up of many serious complaints, and the foundation of it is sometimes laid by those that appear to be of the most trifling nature. It is that in cattle which glanders and farcy are in the horse—the breaking up of the constitution.

Dysentery may be a symptom and a concomitant of other diseases. It is one of the most fearful characteristics of murrain; it is the destructive accompaniment or consequence of phthisis. It is produced by the sudden disappearance of a cutaneous eruption; it follows the secession of chronic hoose; it is the consequence of the natural or artificial suspension of every secretion. Were any secretion to be particularly selected, the repression of which would produce dysentery, it would be that of the milk. How often does the farmer observe that no sooner does a milch cow cease her usual supply of milk, than she begins to purge? There may not appear to be anything else the matter with her, but *she purges*, and in the majority of cases that purging is fatal.

It may, sometimes, however, be traced to sufficient causes, exclusive of previous disease. Unwholesome food—exposure to cold—neglect at the time of calving—low and marshy situations—the feeding on meadows that have been flooded (here it is peculiarly fatal)—the grazing upon the clays lying over the blue lias rock—the neighborhood of woods, and of half stagnant rivers—the continuation of unusually sultry weather—over-work, and all the causes of acute dysentery may produce that of a chronic nature—or acute dysentery neglected, or badly, or even most skillfully treated, may degenerate into an incurable chronic affection. Half starve a cow, or overfeed her, milk her to exhaustion, or dry her milk too rapidly, dysentery may follow.

The following may probably be the order of the spmptoms, if they are carefully observed. There will be a little dullness or anxiety of countenance, the muzzle becoming short and contracted—a slight shrinking when the loins are pressed upon—the skin a little harsh and dry—the hair a little rough—there will be a slight degree of uneasiness, and shivering, that scarcely attracts attention—then (except it be the degeneracy of acute into chronic dysentery) constipation may be perceived—it will be to a certain degree obstinate—the excrement will be voided with pain—it will be dry, hard, and

expelled in small quantities. In other cases, perhaps, purging will be present from the beginning; the animal will be tormented with tenesmus, or frequent desire to void its excrement, and that act attended by straining and pain, by soreness about the anus, and protrusion of the rectum; and sometimes by severe colicky spasms. In many cases, however, and in those of a chronic form, few of these distressing symptoms are observed even at the commencement of the disease, but the animal voids her fæces oftener than it is natural that she should, and they are more fluid than in a state of health; but at the same time, she loses her appetite and spirits and condition, and is evidently wasting away.

In acute cases, if the disease does not at once destroy the animal, the painful symptoms disappear, and little remains but a greater or less degree of dullness, disinclination to food, rapid decrease of condition, and frequent purging. The fæces are often voided in a peculiar manner; they are ejected with much force, and to a considerable distance, and the process of *shooting* has commenced. The fæces, too, have altered their character; a greater quantity of mucus mingles with them; sometimes it forms a great proportion of the matter evacuated, or it hangs in strings, or accumulates layer after layer under the tail. The farmer and the practitioner anxiously examine the evacuation. As the thin mass falls on the ground, bubbles are formed upon it. They calculate the time that these vesicles remain unbroken. If they burst and disappear immediately, the observer does not quite despair; but if they remain several minutes on the surface of the dung, he forms an unfavorable opinion of the case, for he knows that these bladders are composed of the mucus that lined the intestines, and which is not separated from them except under circumstances of great irritation; or which being thrown off, the denuded membrane is exposed to fatal irritation. In this state the beast may remain many weeks, or months; sometimes better, and sometimes worse; and even promising to those who know little about the matter that the disease will gradually subside. The farmer, however, has a term for this malady, too expressive of the result, although not strictly applicable to what is actually taking place within the animal. She is *rotten*, he says, and she dies as if she were so. There are cases of recovery, but they are few and far between. Most cases gradually draw to a close. The beast is sadly wasted—vermin accumulate on him—his teeth become loose—swellings appear under the jaw, and he dies from absolute exhaustion; or the dejections gradually change their character—blood mingles with the mucus—purulent matter succeeds to that—it is almost insupportably fetid—it is discharged involuntarily—gangrenous ulcers about the anus sometimes tell of the process that is going on within; and, at length, the eyes grow dim and sunk in their orbits, the body is covered with cold perspiration, and the animal dies.

In some cases the emaciation is frightful; the skin cleaves to the bones, and the animal has become a living skeleton; in others there have been swellings about the joints, spreading over the legs generally, occasionally ulcerated; and in all, the leaden color of the membranes, the rapid loss of strength, the stench of the excrement, and the unpleasant odor arising from the animal himself, announce the approach of death.

The appearances after death are extraordinarily uniform, considering of how many diseases this is the accompaniment or the consequence, and the length of time that it takes to run its course, and during which so many other organs might have been readily involved. The liver is rarely in any considerable state of disease. The first and second stomachs are seldom much affected; the third stomach presents a variable appearance with regard to the state of the food that it contains, and which is sometimes exceedingly hard, and sometimes almost pultaceous, but there is no inflammation about the stomach itself. The fourth stomach exhibits a peculiar change: there is an infiltration or collection of serous fluid in the cellular substance between the mucous and muscular coat, showing some, but no very acute, degree of inflammation in the submucous tissue. The small intestines are frequently without a single trace of inflammation, but sometimes, however, they are thickened and corrugated, but not injected. It is in the cæcum, colon, and rectum, that the character of the disease is to be distinctly and satisfactorily traced.

The account of these *post mortem* appearances is given at considerable length, because they clearly indicate the hitherto unsuspected nature of the disease—unsuspected at least among veterinarians; and they will probably lead to a mode of treatment that promises a little more success than has hitherto attended the efforts of practitioners. It is plainly *inflammation* (at first acute, but gradually assuming a chronic, a more insidious and dangerous form,) *of the large intestines, the colon, cæcum, and rectum; it is the dysentery of the human being;* it is that which was once the scourge of the human race, but thousands of whose victims are now rescued from its grasp by the discovery of its real seat and character, and the adoption of those measures which such a disease plainly indicates.

If this malady be of an inflammatory type, the first, and most obvious, and most beneficial measure to be adopted, is bleeding; and this regulated by the age, size, and condition of the beast, the suddenness and violence of the attack, and the degree of fever. From two to five or six quarts of blood should be abstracted. There must be very great debility—the disease must in a manner have run its course, or the practitioner will be without excuse who, in a case of inflammation of the large intestines, neglects the abstraction of blood. General bleeding—bleeding from the jugular—will be of service, as lessening the general irritation, and the determination of blood to the

part; but in this case the practitioner can in some measure avail himself of the advantage of local bleeding, for by opening the subcutaneous or milk vein he takes blood from the parietes of the abdomen, and from that portion of them which is nearest to the inflamed part. The repetition of the bleeding must depend on circumstances, of which the practitioner will be the best judge.

Another abater of inflammation will be a mild aperient. A little consideration will show that this is not contra-indicated even by the degree of purging which then exists; for the retention of matter, such as that discharged in dysentery, must be a far greater source of irritation than the stimulus of a mere laxative.

The kind of medicine is a consideration of far more consequence than seems to be generally imagined. There would be a decided objection to the aloes so frequently resorted to in these cases: there would be some degree of doubt respecting that excellent and best medicine for general purposes, the Epsom salts. Both of them might add to the excessive irritation which the practitioner is so anxious to allay. Castor oil will here, as in acute diarrhœa, be decidedly preferred, and in the same doses. Some judgment will be required as to the repetition of the purgative. Its object is the simple evacuaof morbid fæcal matter, and not the setting up of any permanently increased action of the bowels: therefore, if, instead of the comparatively scanty and mucous discharges of dysentery, a fair quantity of actual fæces has been brought away, there can be no occasion for, or, rather, there would be objection to, the continuance of the purgative. Linseed oil certainly stands next in value to the castor oil as an aperient, when the bowels are in an irritable state.

This being inflammation of the large or lower intestines, there will be evident propriety in the administration of emollient injections. By means of the injection or enema-pump, the intestines in the ox, which are the seat of this disease, may be completely filled with some emollient fluid; and that which is most of all indicated here, and especially in the early stage of treatment, is gruel, well-boiled and thick; a pailfull of it may be thrown up with advantage two or three times every day.

Let it now be supposed that this treatment has been pursued two or three days;—if the discharges are more fæcal, a little greater in quantity, and attended by less pain or less effort in the expulsion of them, that purpose has been effected which the practitioner was anxious to accomplish, and he must look about for other measures; or, if the state of the animal remain the same, it will be useless longer to pursue this plan. Then the surgeon refers once more to the character of the malady—inflammation of the mucous membrane of the large intestines—and he asks what he can bring in direct contact with the diseased surface, that is likely to allay irritation or to abate inflammation. Opium immediately presents itself, at

once an astringent and an anodyne—an astringent, because it is an anodyne—and he determines to give it in doses of half a drachm, and in the best form in which it can be administered, namely, in that of powder, mixed with thick gruel. He likewise adds it to the gruel of the injection, either under the form of powder, or he boils a few poppy-heads in water, and then causes the gruel to be made with the decoction.

Here all practitioners seem to agree. Whether they prepare the way for the opium by the administration of an aperient, or whether, deceived by the state of purging, they give it at once, they are all anxious to try the power of this drug; but too many of them, either forgetting or not knowing the nature of the disease, add medicines of an opposite character, and that cannot fail of being injurious. They administer astringents and tonics, which are useful and indispensable in a later stage of the treatment, but, while the inflammation remains unsubdued, are only adding fuel to fire. There are too many practitioners who scruple not to give alum and sulphate of zinc as soon as they are called in to such a case, and before the lining membrane of the intestines is prepared for their action. These drugs are acrid—they are caustic as well as astringent—they are astringent because they are caustic, and they too frequently set up another and destructive inflammation.

It is usual, however, to add something to the opium, in order to increase or to regulate, or to modify its power; and that which is without comparison the most serviceable is one of the mild preparations of mercury, viz., calomel, or the blue pill, or mercury triturated with chalk. Mere theory might induce the fear that mercury would add to the irritation already too unmanageable, and so it would, if given alone; but, combined with and guarded by the opium, it has the most beneficial effect: the opium does not produce costiveness—the calomel does not gripe and purge, but irritation is allayed, while the natural action of the bowels is promoted.

In order that this mode of treatment may have a fair chance, the beast should be housed and fed on bran-mashes, a little hay, and plenty of well boiled gruel. While the patient continues at grass, the practitioner has no chance, however skillful in other respects his treatment may be. So much depends on the avoidance of all green and succulent food, that many a beast, from whom every symptom of dysentery had disappeared, has relapsed, and been lost, from having been turned out too soon. The green food of one day has produced irreparable mischief.

There are other auxiliary measures which deserve consideration. Setons in the dewlap have been strongly recommended. They may be useful when much fever accompanies the early stage of dysentery, for they will, in some measure, divert the current of blood from the inflamed and irritated part, and thus lessen the local inflammation

and discharge, and also the general fever; but no very material degree of benefit can be expected from them; and there certainly cannot be that importance which is sometimes attached to the substance or the root that is inserted. The common cord, or hair-rope, will answer every purpose: the black hellebore root, however, produces the speediest inflammation and the most copious discharge.

Fomentation of the right flank and the right side of the belly with hot water, or, in acute cases, the blistering of those parts, will be far more serviceable than any seton in the dewlap can possibly be.

That admirable disinfectant, the chloride of lime, promises to be of essential service in the treatment of dysentery; not only in changing the nature of the intestinal discharge, and depriving it of all its putridity, but in disposing the surface of the intestine, with which it may be brought into contact, to assume a more healthy character. When applied externally to wounds and ulcers of every kind, it effects wonders in both of these respects; and, being properly diluted, it has not been found to give any great pain, or dangerously to increase inflammation in the most irritable ulcer. It may be administered either by the mouth, or in the form of clyster. The practitioner will probably avail himself of its aid in both forms. It should not be mingled with any other drug; but half an ounce of the solution, or a drachm of the powder, may be mixed with a quart of water, and given between the regular periods for the administration of the other remedies.

The reader will mind the caution as to the mode of administering liquid medicine to cattle; for in a disease so serious and so fatal as dysentery, it cannot be too deeply impressed on the mind of the practitioner. Whether the medicine be given by means of the horn or the pump, it should flow as gently as possible down the gullet, that it may not break through the floor of the œsophagean canal, but have a better chance of passing on to the fourth stomach and the intestines.

In this, as well as in the chronic stage of dysentery, a great deal more depends upon attending to the comfort of the animal than too many seem to believe. The patient should be housed, and well littered down, and, in some cases, moderately clothed. Of his food, little portions at a time should be culled for him and offered to him; and warm gruel and warm mashes should be frequently put within his reach. There can be no doubt that more benefit is connected with that one word *comfort*, than can be procured from half the drugs which the veterinary pharmacopœia contains.

In many cases, and in every case that can be brought to a successful termination, it will be observed, after the perseverance of ten days or a fortnight in this mode of treatment, that the pain preceding and accompanying the evacuations is materially lessened, and that the nature of the matter evacuated is changed. The stools will pro-

bably be as frequent; they will be more copious; but less mucus will be found in them, and they will have become more decidedly fæcal and not so offensive. The belly will be less tender; the countenance less anxious; the general appearance improved. The inflammation of the inner surface of the large intestines will have materially subsided, but the habit of purgation will continue for a while, and will be increased by the state of relaxation and debility in which the vessels are left. Then, but not until then, astringents will be admissible and highly beneficial.

Catechu stands at the head of this class of medicines in such a case; and its power may be increased by the addition of oak bark, or it may be given in a decoction of oak bark. The opium must not, however, be omitted; for although direct inflammation may have been subdued, and relaxation and debility have followed, much irritability may remain, to control which the soothing power of opium will be required.

To catechu and opium it has been usual to add chalk; for in all these diseases there is a tendency in the stomach, and probably in the intestinal canal, to generate a considerable quantity of acid. A greater source of irritation can scarcely be imagined when the state of the lining membrance of the large intestine is taken into consideration. The chalk, or the carbonic acid of the chalk, will unite with and neutralize this acid, and render it harmless. Theoretic chemistry would lead to the substitution of magnesia for the chalk, for the carbonic acid being withdrawn, it might be feared that the caustic lime would be injurious; but experience has proved that magnesia is not so efficacious in cattle; that, in fact, it seems to be almost inert, while chalk has usually answered the purpose intended, and no inconvenience has resulted from it.

Some practitioners strangely mingle vegetable and mineral tonics together, forgetful of the decomposition which frequently, or almost constantly, ensues, and the impairment or total loss of medicinal power. Vegetable astringents agree best with the constitution of cattle, and they will not often deceive.

The nature of the disease, however, being considered, will the practioner confine himself to the astringents? He has now to struggle with the consequences of inflammation—the weakness and want of tone which inflammation has produced, not only in the part itself but in the whole system. He will also take into consideration the natural temperament and constitution of cattle; and that they will not bear disease, nor the treatment of disease, like some other animals. Diseases speedily run their course in cattle, and the patients often sink under the prompt and vigorous and scientific treatment of the malady. An ox may bear one copious bleeding well; but he cannot be bled again and again. He will derive the usual advantage from purgation to a certain extent, but care must be taken lest it degen-

erate into the disease which is now under consideration. The practitioner will therefore mingle stomachics, and probably tonics, with his astringents, in this case. Here also he will find the vegetable the best. Experience of its beneficial effect has made ginger a necessary ingredient in almost every medicine, unless the animal evidently labors under fever. Gentian is an admirable tonic and stomachic; and if to these be added colombo and cascarilla, there is sufficient choice. The proportions of the different medicines will necessarily vary with the age and strength of the animal, and the character, duration, and ravages of the disease.

Vegetable astringents and tonics having been fairly tried, and either not producing the desired effect, or beginning to lose their power, the mineral ones may be resorted to. The preference should undoubtedly be given to alum, and that in the common and very convenient form of alum whey. (See List of Medicines.) To this the usual quantity of ginger may be added without producing decomposition; and, if it should be deemed advisable, the opium may be continued. Should this not succeed, or not to the full extent wished, blue vitriol (sulphate of copper) may be substituted; and to this the opium will be a necessary auxiliary. The dose should be about one drachm of the former and half a drachm of the latter. There is no other mineral astringent or tonic that can be depended on or safely given.

Clysters should not be neglected in this stage of the disease. With the assistance of the injection-pump, they promise to be as efficacious as any medicines that can be administered by the mouth, for they may be brought into immediate contact with the inflamed or ulcerated surface. Gruel may be made with a decoction of poppy-heads, already recommended. To this may succeed an infusion of catechu, decoction of oak-bark, and with or without opium; and possibly a weak solution of alum or blue vitriol. The practitioner will here, however, proceed with considerable caution.

The malady being apparently subdued, there will be need for much caution in the after-treatment of the animal. He must not soon return altogether to green meat, and more especially not to luxuriant pasture. The best way to prevent diarrhœa is to continue to give a small quantity of hay for some time after turning to grass, and not to keep him too many hours at a time from water. When coming on, keep the ox as much as possible on hay and bran, and let him have water often in small quantities.

For a long period after a severe attack of this complaint, the animal will be subject to occasional diarrhœa, and will require careful management. The best thing to be done is to get him, as quickly as the state of his constitution will admit, into fair condition, and sell him; but there will be some difficulty in accomplishing this, for abundance even of the most wholesome food will often be more than his debili-

tated powers of digestion can manage, and hoove, or diarrhœa, or dysentery, will ensue. At the best, he will rarely be got beyond fair condition, and with that the farmer must be content. While there are many cases of permanent recovery from dysentery, there are but few cases in which the patient has afterwards grazed and fatted as well as any other beast.

However perfect may seem to be the cure, the animal that has once been a decided *shooter* should never be bred from. There is a taint about him which will almost certainly be communicated to his stock. Dysentery is not only the pest of certain districts, and especially of cold and wet ones, but of certain breeds. But there is not the slightest reason for believing that the dysentery of cattle is contagious.

As the large intestines are the principal, and, in most cases, the only seat of that inflammation which is characterized by the term *dysentery*, other intestines are occasionally subject to maladies either peculiar to them, or in which the neighboring viscera participate to a greater or less extent.

Homœopathic treatment.—When slight, dysentery resembles severe diarrhœa, and requires the remedies which have been indicated under the head of the latter disease.

After some doses of *aconitum*, *arsenicum* is to be given, especially when the evacuations are liquid, or of a greenish color. However, *mercurius vivus* is the chief remedy for this disease, more especially when it occurs under an epidemic form, a thing which is not unusual in spring and at the commencement of summer, when very warm days alternate with cold nights. This remedy is specially indicated when the gums are pale and spongy, the teeth loose, the saliva from the mouth viscid and fetid, when there are frequent efforts to empty the bowels, with a discharge of fetid wind, and scanty dejections mixed with mucus, which presently assume a greenish gray, or a brown tint, or which, accompanied with mucus and blood, pass away in a liquid form after great efforts; the belly is swollen and painful to the touch, as also the lumbar region; the rectum projects outside the anus; it becomes much inflated and extremely sensitive.

In calves, diarrhœa, accompanied with emaciation and loss of appetite, very often puts on the dysenteric character; the animal every moment passes liquid matter of a greenish or yellowish color. In such a case, *pulsatilla* is a specific. Benefit has also been obtained from *chamomilla*, and, when the evacuations were white, from *mercurius vivus*.

COLIC.

Of this disease there are two varieties. The one is FLATULENT COLIC, arising from the distension of certain portions of the intestines,

occasioned by the food contained in them undergoing a process of fermentation. The pain which the animal evidently suffers, his moanings, his striking at his belly with his hind feet, a swelling on the right side of the belly, the occasional discharge of gas from the mouth and anus, constant restlessness, continual getting up and lying down again immediately, and all this accompanied by fever, would induce the suspicion that the animal was laboring under flatulent colic.

There are various reasons, however, why cattle should seldom be subject to this complaint. By the maceration which the food undergoes in the paunch, and the second mastication to which it is subjected in rumination, it is prepared for speedy and perfect digestion. There is neither time nor disposition in the substances contained in the intestinal canal for this process of fermentation to be set up; and if there were, there are no labyrinthine irregularities to detain the gas, but it would be readily pressed on by the common peristaltic motion of the bowels, and expelled. Spasmodic colic has sometimes been mistaken for that which has been occasioned by the distension of the bowels; or, more frequenty, inflammation of the outer coat of the intestines has been confounded with *flatulent colic.*

This species of colic will generally be relieved by the administration of almost any aromatic drink; but the chloride of lime, as in hoove, is most to be depended upon. Two drachms of the chloride dissolved in a quart of warm water, to which an ounce of the tincture of ginger, (or two drachms of the powdered ginger,) and twenty drops of essence of peppermint have been added, will form one of the most effectual colic drinks that can be administered. The choride unites with the extricated hydrogen gas, and causes it, or the greater part of it, to disappear; while the aromatic stimulates the intestine to contract upon and force forward and expel any small portion that may remain.

The beast should be walked about; exercise alone will sometimes cause the gas to be expelled; but the owner must not adopt the dangerous expedient of driving or worrying the beast with dogs, otherwise he may produce strangulation, or *netting*, or rupture of the intestines.

Should the first dose, and gentle exercise for a quarter of an hour, not produce relief, a purgative drink should be given, and that of an aloetic nature, as more likely to operate speedily. Take of Barbadoes aloes four ounces, pimento powdered two ounces, and gum Arabic two ounces; pour on them a quart of boiling water; stir the mixture well, and often; when it is cold, add half a pint of spirit of wine, and bottle the whole for use: shake the bottle well before the requisite quantity is poured out. Clysters of warm water, or thin gruel, should not be neglected, and with each clyster two ounces of the aloetic tincture should be administered. Friction on the belly and flanks is occasionally useful, and, in obstinate cases, it will be advisable to stimulate the whole of the belly with spirit of turpentine well

rubbed in. In very bad cases, but not until other remedies have been applied, it will be useful to bleed. Warm mashes, warm gruel, and good old hay, should constitute the food of the beast for some time afterwards.

A more prevalent species of colic, is the SPASMODIC. It is spasm, or contraction of a portion or portions of the small intestines, and accompanied by more excruciating pain than the former. The animal is exceedingly uneasy, lowing, pawing, striking at his belly with his hind legs or his horns; continually lying down and getting up, becoming very irritable, and sometimes being dangerous to handle. It is distinguished from flatulent colic by the smaller quantity of gas that is expelled, the comparative absence of tension or enlargement of the belly, the more evident spasms relaxing for a little while, and then returning with increased violence, and the freedom with which the animal moves during the remissions.

The feeding on acrid plants, or even on healthy food too great in quantity or too nutritive, the commencement of feeding on grains, exposure to cold after work, the drinking of too cold water, and especially after exercise, or of water impregnated with metallic salts, are occasional causes. More dangerous ones are the long continuance of purging, and also the long continuance of costiveness. The treatment will be the same, except that as this proceeds from irritation in the intestinal canal generally, or in particular portions of it, which is apt to run on to inflammation, bleeding will be earlier resorted to; and the practitioner will not suffer the first symptom of inflammation to appear, without adopting the best method of subduing it. After every case of colic, whether flatulent or spasmodic, the animal will require some attention and nursing, for in both of them the intestines are considerably weakened and predisposed to a repetition of the attack, and there are few maladies, the habit of the recurrence of which is so soon formed.

Homœopathic treatment.—The curative means are *aconitum* (one or two doses), and then *arsenicum* (three or four doses). If these remedies diminish the sufferings a little, but the constipation still continues, *nux vomica* is given, when the fæcal evacuations are in small hard lumps; *opium*, when they are blackish, as if burned, and when it becomes necessary to extract them from the rectum with the hand; *plumbum* in the most obstinate cases, where the rectum is empty. We may also try *carbo vegetabilis* and *colocynthis*. Consult the articles Diarrhœa and Distension of the Rumen by Gas, for these two symptoms are sometimes associated in colic.

STRANGULATION OF THE INTESTINES.

Spasmodic colic, if neglected, or bidding defiance to medical treatment, occasionally leads to such an entanglement of different parts of

the bowels with each other, that they become tied into a kind of knot, and the passage of food along them is obstructed. When the small intestines of cattle are observed hanging loose, as it were, at the end of the mesentery, (see fig. 2, p. 330,) it is not to be wondered at, if, in the disturbed, increased, hurried, and sometimes inverted peristaltic motion which takes place in consequence of colic, one portion of the intestine should be entangled among the rest, and the fatal knot should be tied. Occasionally a small piece of fatty matter disengages itself from the mesentery and hangs floating in the belly, and then, either in the changes of situation which the bowels undergo in natural exercise, or more particularly in the commotion of colic, it entwines itself round a portion of the intestine, and obstructs the passage. These twists, and loops, and knots, are sometimes strangely intricate. When the dead animal lies before the practitioner, it is almost impossible to unravel them. This is the true *net* or *knot*, so dreaded in some parts of the country. It is the result of those colicky pains which have been mistaken for strangulation, and which have been increased and hurried on to the production of this involved state by the absurd and brutal measures that have been adopted. Strangulation having once taken place, there can be no remedy. All that can be done is to attack every case of colic in good earnest, as soon as it is perceived, for no one can tell how soon the displacement, twist, knot, or whatever it be, will occur in consequence of the perverted action of the intestines, or the violent struggles of the animal, caused by the torture which he endures.

THE CORDS, OR GUT-TIE.

This is another singular and fatal species of intestinal strangulation. It is not of unfrequent occurrence in some districts, and especially in wet and marshy situations: it is peculiar to the ox, and is rarely observed in him after the second or third year. The beast shows disinclination to food—rumination is suspended, or performed in a listless, interrupted manner—the animal appears to be griped—he strikes at his belly with his hind legs—he lies down, and, as he gets up again, bows his back in an extraordinary way, and then, all at once, stretching out every limb, he gives the spinal column a somewhat concave form. Small quantities of fæces are voided, mingled with mucus, and sometimes with blood; and if the animal is examined, by introducing the hand into the rectum, he evidently suffers extreme pain.

The ailment is referable to one side more than the other, and generally to the left side. The hind leg on that side is frequently advanced and then retracted, and, in some cases, becomes partially paralyzed.

These symptoms are more and more alarming: if the ox can be

induced to eat, the griping pains are immediately increased—the belly swells—the countenance becomes anxious—the ears, the horns, the nose, and the thighs become cold—the pulse is small and accelerated, and scarcely to be felt—the breathing is laborious and heard at a distance—the mouth and nostrils are pale. The disease continues during six, seven, or eight days: it yields to no medicine—it is aggravated by most of the measures adopted—it is especially so if the beast is moved about—and at length death terminates the period of suffering.

On examination, strangulation of some part of the intestine is found, and generally of the small intestine. It is tied by a distinct and evident cord—in some cases it is the spermatic cord, which, after castration unskillfully performed, or now and then by mere accident, has been retracted into the belly, and has become enlarged, and has had tumors forming on it, and particularly at its extremity. Oftener it is an adventitious or unnaturally formed membrane, which becomes entangled round the intestine, and assumes the appearance of a cord.

The mode of operation, in castrating bullocks, is often very absurd. Some practitioners pride themselves on performing it with scarcely the loss of any blood. They open the scrotum, and lay bare the spermatic cord, and then, by mere dint of pulling and twisting, they tear it out. There is, certainly, no bleeding, and the portion that remains immediately retracts into the belly; but the consequence of all this violence is that inflammation ensues—tumors, false membranes are formed, and the foundation is laid for this complaint. Others draw the cord out as far as they can without tearing it, and then cut it off close to the pelvis. There is no external bleeding in this case; but there is bleeding within the cavity of the belly, and a source of irritation is set up by the presence of this blood, and various abdominal diseases ensue, and, among the rest, the *cords*, or *gut-tie*.

It is not, however, to be uniformly traced to this cause alone. It seems, especially, to prevail in low and damp situations—it has followed the use of half mouldy and unwholesome fodder—it has seemed to be connected with hard work, and that on an irregular or steep surface; and some have imagined that it is most prevalent where the floor of the ox stables is too much inclined, on account of the great pressure on this part of the abdomen, and especially in the act of rising. It can be readily believed that any source of irritation, whether of the spermatic cord, or of the intestines lying in the neighborhood of it, or of the intestinal canal generally—in fact, that any or all of the sources of common colic may be the predisposing or immediate causes of this species of strangulation.

Although it has been stated that no medicine seems to be of avail, the patient should not be abandoned. There is an operation,

apparently difficult and dangerous, but really simple, easy to be performed, and generally effectual.

It will be evident that this operation should be performed, the side line being used, and the beast remaining standing close to a wall, and fastened to it as well as circumstances will permit. The incision should be made on the left side, and taking, as the centre of it, the spot at which the flank is generally punctured in cases of hoove, and where a small portion of the jejunum, and that which is the most likely to be entangled, is protruded over the rumen, and floats by itself at the extremity of the mesentery. It should be a vertical incision, or a little oblique, in a direction from behind forward. A small opening should first be made, through the integument and muscle, avoiding, if possible, the peritoneum. Into this the first and second fingers of the left hand should be introduced, and thus, by means of a probe-pointed bistoury, guarded and guided by these fingers, the wound may be enlarged so as to permit the introduction of the hand of the operator. There will probably be a considerable gush of blood when the external oblique is first divided, but that will speedily cease by the retraction of the artery.

The peritoneum should next be divided, if it has not been so already, and the hand of the surgeon, the arm having been bared and well oiled, should be introduced into the wound; the epiploon or cawl gently torn; and the hand passed among the intestines in a direction upward and backward, or a little behind the kidneys. The operator will soon feel the strangulated part, and the cord by which it is suspended or tied, and usually attached to some part of the pelvis. Having satisfied himself with regard to the situation of *the cord*, he will withdraw his hand, and, taking another shorter and more curved and probe-pointed bistoury, and having it in the hollow of his hand, and guarding the cutting edge with his finger and thumb, he will introduce it into the abdomen, find out the cord again, and cautiously divide it. The hand will once more be removed, in order to get rid of the bistoury, and then re-introduced to ascertain whether the whole of the strangulated part has been liberated, which is easily effected by tracing all the neighboring circumvolutions and passing them through the hand.

The operator being satisfied as to the state of the bowels, brings the edges of the wound together, and confines them by a sufficient number of stitches, including the peritoneum, muscle, and integument, in the same stitch. A pledget of tow is placed over the wound, and a broad bandage passed tightly several times round the belly, which must not be removed during the first six or eight days.

The majority of cattle thus operated upon are saved, and the wound is usually healed in somewhat less than a month. It may, however, be supposed that after the extensive opening into the abdominal cavity, and this laceration of the cawl, and groping and cutting

among the intestines, some alarming symptoms will occasionally supervene. The belly will swell, and sometimes to a considerable extent. Fomentations and, if necessary, scarifications may be resorted to. There may be manifest symptoms of fever, as shiverings, heaving at the flanks, and cessation of rumination. Blood should then be abstracted, according to the state of the patient; half-pound doses of Epsom salts should be given morning and night, until the bowels are moderately opened, and the beast should have little besides mashes and gruel, and should be kept as quiet as possible.

INTROSUSCEPTION OF THE BOWELS.

This is another fatal consequence of colic. While certain portions of the ileum or jejunum generally, but occasionally of the larger bowels, are distended by gas, other parts are spasmodically contracted, and then, by the increased peristaltic motion which is going on, the collapsed part of the superior or anterior intestine slides, or is forced down, into the distended part behind; or, by that inverted action which takes place in the intestine commotion of colic, a contracted portion of the bowel slides or is forced into the distended part before, and thus one intestine is strangely contained within another, and that occasionally reaching to a considerable extent. The mesentery is usually torn in this unnatural procedure, for otherwise that too must be taken up or carried down into the distended intestine above or below.

It will be easily conceived that this will inflict great torture on the beast, and an examination after death will sufficiently prove the intensity of the suffering; for there will be much inflammation, and generally gangrene of the involved part; and sometimes of both portions of the intestine. The symptoms by which the practitioner may be induced to suspect, or may know, that colic has run on to introsusception, are not yet determined. Increase of pain, attended by obstinate constipation, rapid prostration of strength, and comparatively little fever, may be obscure indications. It is evident that this case must be beyond the reach of medical skill.

INVERSION OF THE RECTUM.

It has occasionally happened in the straining of diarrhœa, and in the still more violent efforts with which the fæces are expelled in dysentery, that a portion of the rectum is protruded from the anus; the sphincter muscle of the anus then contracts violently upon it, and no effort of the animal can draw it back, nor will it readily yield to any external force employed. The blood is necessarily congested in the protruded intestine, from the situation of the part; the gut is intensely red, and it gradually becomes livid, black, gangrenous. The animal all the while is making frequent and violent efforts, during which small quantities of excrement, or mucus, or blood, or gas, are

extricated; the protrusion of the gut increases; irritative fever ensues; and death speedily follows.

In order to allay irritation, and in some measure lessen these efforts by which more of the intestine is expelled or its return prevented, a pint of castor oil with two drachms of opium should be administered, and a quantity of blood, varying with the size and condition of the animal, abstracted. The protruded part should be thoroughly cleaned, and diligently fomented, during the space of an hour, with a decoction of poppy-heads, lukewarm. Gentle, but long-continued efforts should then be made to return the intestine, which will be accomplished much oftener than would be imagined if the operator will have patience enough. The gut having been returned, cold water should be applied around the anus, and for a considerable time, in order that the sphincter muscle may more powerfully close, and confine the intestine in its proper situation. It may, however, again protrude, but it should be immediately returned, and care having been taken to allay the irritation of the bowels and of the system generally, the straining will gradually cease, and the intestine will no longer be forced out.

If the protrusion continues in despite of every effort, and the part begins to swell, and to become black, and fetid, and mortified, and the pulse is small, and the mouth hot, and the ears cold, and the muzzle dry, and the eyes red, and the appetite and rumination are suspended, and the animal is rapidly becoming weak, the practitioner must have recourse to a bold and dangerous operation, but which will succeed much oftener than it will fail: he must cut off the protruded intestine close to the anus. There will probably be considerable hæmorrhage, but he must not be alarmed at that; it will be beneficial rather than injurious; it will prevent or abate inflammation, and it will cease long before the strength of the patient is exhausted. The little portion of intestine half protruded at the anus will gradually return; the sphincter muscle will contract; union of the divided portions of the intestine will take place, and the animal will perfectly recover.

Homœopathic treatment.—After having reduced the intestine, previously oiling it, we should prescribe internally *belladonna* and *mercurius vivus*, if symptoms of inflammation be observed. When the accident has been caused by the effects occasioned by constipation, this is a case for recurring to *murias magnesiæ*, just as *argilla* is suitable when diarrhœa is the cause of the accident. *Arsenicum* also is a very effectual means in the latter case.

CONSTIPATION.

The immediate cause of many of these affections of the bowels is constipation. The beast is *sapped* or *bound*. This constipation is

often exceedingly difficult to remove, not, perhaps, from any want of power in the intestinal canal to be acted upon by purgative medicines, but from the impossibility of getting any considerable proportion of the purgative into contact with the internal surface of the bowels. It has already been observed that in a state of health much of the fluid swallowed by cattle enters into the rumen, and is detained there for the purpose of macerating the food and preparing it for rumination; and we have proof, and that sufficiently annoying, that in some circumstances of disease, all the fluid swallowed goes into the rumen, and is lost so far as the purpose for which it was administered is concerned. It has not unfrequently happened that six, seven, and eight days have passed, and the bowels have remained in a constipated state. This must of necessity aggravate the symptoms of many diseases, and lay the foundation for others.

When the state of the animal indicates the administration of the Epsom salts, they should be accompanied by the usual quantity of some aromatic, (half an ounce of ginger,) and be given in as gentle a way as possible. There can scarcely be a better way than suffering it to run from a long narrow-necked bottle introduced into the mouth. Should not this operate at the expected time, a second dose should be given, and, probably, with the same quantity of the aromatic; certainly so if little fever be present. If this, however, should have no effect, it is very probable that from some sympathetic influence extending over the whole of the digestive organs, the roof of the rumen is open, or the pillars of which that roof is composed are in a relaxed state, and yield even to the pressure of a fluid gently poured down the gullet. Then the next dose (for the purgative must be continued until it does operate, and the nature of that purgative, and the knowledge of the manner in which the quantity already given has been disposed of, remove all fear of inflammation or superpurgation being produced) must have an increased proportion of aromatic, increased in defiance of existing fever, and increased to the full extent to which the practitioner dares to go. Probably, a cordial-drink (an ounce of ginger and the same quantity of carraway powder) would be given with advantage; for the rumen might be roused to its natural action by the stimulus, and the pillars of its roof might be closed, and the next dose might run on through the manyplus into the abomasum. The rumen may possibly be roused to act in another way; a portion of the fluid that it contains may be injected into the œsophagean canal by a process somewhat resembling that by which the pellet of food is thrown there for remastication; and the muscles of that canal, and of the base of the gullet, not being able to grasp it because it is a fluid, it will necessarily pass on through the manyplus into the fourth stomach and intestines.

It is by some mechanism of one of these kinds that purging is at length established after obstinate cases of constipation; or, when the

animal dies and almost all the purgative medicine that has been given is found in the rumen, it is because that stomach has not been sufficiently stimulated. There is something in the structure of cattle which renders certain medical rules and principles altogether inapplicable, and which, in defiance of all fever, occasionally compels us to mingle strange doses of aromatics and stimulants with the very means by which we are endeavoring to subdue inflammation. This is a very important consideration in the treatment of disease.

Homœopathic treatment.—The more or less inflammatory state which generally accompanies it, requires that we commence the treatment with a dose of *aconitum*. The most effectual means then is *nux vomica;* it is indicated chiefly, when the evacuations from the bowels are scanty, hard, covered with mucus, and when the animal frequently draws up the belly. If there be no thirst, we should have recourse to *china* and *bryonia*. The latter remedy is also suitable when the constipation has been produced by cold, a circumstance in which it frequently alternates with diarrhœa. *Opium* and *argila* must be employed when the inactive state of the intestinal tube allows nothing to escape from the body, and the animal remains lying down, though evincing no pain. In very obstinate constipation, where the rectum is empty, and also where only a small quantity of matter escapes, which is not very hard, *plumbum* never fails to be effectual.

CALCULI.

It has been stated (pp. 299 and 300) that various concretions are found in the rumen of cattle. It is the natural situation for them, for there the food is longest detained, and there they have time to form. A few, but much smaller, calculi are occasionally found in the reticulum; others, composed of thin and friable concentric layers, occupy, yet comparatively rarely, the large intestines of cattle; but they also are not of great size, for the food passes too rapidly over the smooth surface of these portions of the digestive canal. There are no symptoms by which their presence can be recognized, nor is there any evidence of their being the cause of disease, although it is not improbable that the presence and pressure of these bodies, and the irritation produced by them, may in some instances be the cause of colic, strangulation, and other serious affections.

WORMS.

These occasionally are found in the intestines of cattle, but in no great quantities; nor are there any authenticated accounts of their being the cause of irritation or disease. The food is so perfectly prepared for digestion, and that process is so rapidly accomplished, and the nutriment is so completely extracted, that there is little left for the support of worms; nor, if they are received into the intes-

tines in the state of ova, or eggs, would they be likely to escape the processes of digestion which take place in cattle.

The *Amphistoma conicum*, a worm with a mouth, or the appearance of one, at each end, and often found plentifully in the intestines of birds, frequently inhabits the rumen and reticulum of cattle. It is here of considerably larger size, and swells into a somewhat conical form.

The *Tænia denticulata*, the denticulated tape-worm, small in size, and the neck becoming fine, and sometimes almost thread-like, is found in the fourth stomach and in the small intestines.

The *Lumbricus teres*, the common intestinal round worm, lives in the small intestines.

A small species of the *Strongylus* is a frequent companion of the last; and another small long worm, the *Tricocephalus affinis*, with its minute head attached to its lengthened and thread-like neck, has been discovered in the cæcum.

The presence of these worms is rarely taken into account by the practitioner, and few means are taken for their expulsion.

Mention has already been made of the hydatid (*Cœnurus cerebralis*) inhabiting the brain; and others (*Cysticerci tenuicolles*) found in the liver, the lungs, the spleen, and in the peritoneum and the pleura; the *Strongylus filaris*, occupying the bronchial tubes of cattle, and the *Distoma hepaticum*, the *fluke worm*, swimming in the biliary ducts.

Homœopathic treatment.—The chief remedy is *china*, in multiplied doses, and then *sulphur*; if there be a dislike for food, *antimonium crudum* should be given.

DROPSY.

This is an accumulation of fluid in the cavity of the belly. The whole of that cavity is lined with, and every viscus which it contains is covered by, a polished glistening membrane, so that the contents of the abdomen may glide over and move easily among each other, and the injurious effects of friction be as much as possible avoided. In a state of health there are certain vessels which continually secrete or pour out the fluid that is requisite for this purpose, and which are called *exhalent* vessels; and there are others that take this fluid up and carry it into the circulation when it has discharged its duty, or when it is secreted in undue quantities, and which are denominated *absorbent* vessels. Dropsy, then, is the consequence of the pouring out of an undue quantity of fluid, and faster than the absorbents can carry it away; or it is the pouring out of the natural quantity while the absorbents are paralyzed, or do not do their duty in removing it; and in either way it accumulates in the abdomen. It is easy, therefore, to suppose, that when the lining membrane generally, or a por-

tion of it, is inflamed, and a greater quantity of blood than usual is determined to that part, the secretion from the exhalent vessels will be increased; and in consequence of this there will be accumulation of fluid in the bag of the heart, when that organ, or its investing membrane, is inflamed; dropsy in the chest will be the consequence of pleurisy, and dropsy of the abdomen that of inflammation of the peritoneal membrane generally, or of any part of it. Chronic inflammation of the liver or spleen, or of any particular portion of the intestinal canal, will have the same termination from increased action of the exhalents; a similar effect will occasionally be produced by the sudden stopping of any long-continued evacuation, or acute or chronic eruption; and on the other hand, feeding in low, marshy situations, the privation of wholesome aliment, and every cause of general debility, will produce an accumulation of fluid from loss of power in the absorbents.

Of acute dropsy the practitioner has occasional examples. A beast, apparently well on the preceding day, suddenly exhibits manifest symptoms of inflammation of the bowels. The disease proceeds in defiance of all medical treatment, and in two or three days the patient is lost. On examination after death, the traces of inflammation of the peritoneum are sufficiently evident; there is deposition of flocculent matter; there are adhesions, but, most important of all, the belly is filled with clear, or turbid, or bloody fluid, and the death of the animal was as much occasioned by the irritation produced by the pressure of this fluid, and the labor of breathing which it occasioned, as by the previous or still-existing inflammation.

Of chronic dropsy, or a slower filling of the belly, he has more frequent proof. The beast increases slowly in size; it is an enlargement, not of the left side as in hoove, or of the right as in flatulent colic, but of the belly generally, and sometimes almost as slow as in the increase of condition. It evidently is not that, for the limbs are wasting, or if they occasionally increase in size, it is a puffy œdematous enlargement, and not the accumulation of flesh and fat. The animal at the same time is dull; disinclined to move; the skin is dry; the coat is rough; the thirst is excessive; there is alternate constipation and diarrhœa; the membranes of the mouth and nose are pale, and the conjunctiva is of a feint yellow. By degrees the belly drops, and leaves a considerable hollow at the flanks, and by tapping on the sides the evident fluctuation of water can be perceived. The pressure of the fluid on the diaphragm lessens the cavity of the chest, and does not leave sufficient room for the lungs to expand; labor of breathing ensues—it increases; the animal is not able to stand long, and when he lies down the respiration is so difficult, and the feeling of suffocation is so strong, that he scrambles up again as quickly as his remaining strength will permit, and at length dies, either of absolute suffocation or mere debility.

The chance of success in the treatment of such a disease must be little. The first object is to relieve the sad oppression under which the animal labors, and that must be effected by puncturing the belly, and suffering the fluid to escape. There is neither art nor danger about the operation. The beast should be tied up close, and a side line put on; a puncture should be made with a lancet or trochar under the belly, six or eight inches from the udder, and half as much from the middle line of the belly, and on the right side—the milk vein and the artery which accompanies it being carefully avoided. The opening should not be larger than would admit the little finger; and if it be made with the trochar, the tube may be left in the wound until the fluid has quite run out.

The wound being thus small, there is no need for the often fruitless care to close it again with adhesive plaster when the purpose for which it was made has been effected. There will not only be no danger, but manifest advantage, in a small drain of this kind being left open; for the fluid which may continue to be secreted will dribble away during two or three days, and thus permit the peritoneal membrane and the abdominal viscera (freed from the oppression around them) to recover their healthy tone; whereas, if the wound be immediately closed, the fluid of dropsy will begin at once to accumulate again, and there will be far less chance of effecting permanent benefit. The quantity of fluid that is sometimes got rid of by means of this operation is very great. It is by no means uncommon for twenty gallons to escape, and there are records of thirty-two gallons having been drawn at once. There is little chance of permanent cure in cases like these, for there must have been great disease and disorganization in order to produce effusion to this extent, and that disease must have been of long standing, and therefore not easy to be removed. In addition to this, all the viscera of the abdomen must have been debilitated, and have lost their natural tone and function by the continued pressure and maceration. Still a cure is worth attempting, for the practitioner has done little by the mere temporary relief which the operation has afforded.

In order to prevent the refilling of the belly, two objects must be accomplished, namely, the determination of this fluid to some other part where it shall be regularly discharged, and the restoration of the general health of the animal, and, with this, the proper balance between the exhalent and absorbent vessels. It is therefore usual to give a dose of physic immediately after the operation, that the fluid which might otherwise begin again to fill in the belly may be carried off by the discharge thus established; the physic is repeated as frequently as the strength of the animal will permit. This is a way of proceeding, however, not very favorable to the re-establishment of health and strength, and therefore much greater reliance is placed on a course of diuretic medicine, with which tonics can be com-

bined; purgative medicine being still occasionally given. Half an ounce of nitre, with a quarter of an ounce each of tartrate of iron, commom liquid turpentine, gentian, and ginger, may be given daily with great advantage. Bran and malt mashes will be useful at first, and when the beast goes again to grass, care should be taken that the pasture is good, but not too luxuriant or rank. In general, some weakness and disinclination to food will remain two or three days after the operation, attended at first by considerable heaving, and apparent distress, for it is a great change from the tumid and overloaded belly to the perfectly free and natural state of its contents, and which do not at once accommodate themselves to that change.

The belly so frequently fills again after the lapse of two or three weeks, that it will be prudent to part with a cow that has been dropsical as soon as she can be got into tolerable condition. The exhibition of diuretic and tonic medicines will, perhaps, stave off the return of the disease until this can be accomplished; but the organs of digestion have been so debilitated, and these exhalent and absorbent vessels have been so habituated to an unnatural action, that a perfect and permanent restoration to health can seldom be expected. A second operation may be attempted if the belly has filled again, but the chances of success are then most materially diminished.

There is scarcely a book on cattle medicine in which, if this disease be mentioned at all, there is not strict caution that the beast should not have too much water. This is altogether erroneous. The object to be accomplished is to restore the animal as nearly as possible to a state of health; and this can never be effected by curtailing the proportion of fluid that is necessary for the maceration and digestion of the food, and the supply of all the secretions. A state of unnatural thirst and fever would, on the contrary, be induced, which would weaken the animal, and dispose it for a recurrence of the disease.

Homœopathic treatment.—The remedies employed in this affection, and in the order in which they are here enumerated, are *dulcamara, digitalis, helleborus niger, arsenicum,* and *china;* to each some days should be allowed, in order to expend their action. It is on the *china* principally that reliance should be placed. In one case, where all means failed, benefit was derived from *lycopodium,* whose action may be said to be very powerful in internal dropsies. Ascites complicated with anasarca has been cured solely by alternate doses of *china* and *arsenicum,* a mode of proceeding which experience warrants recommending.

HERNIA, OR RUPTURE.

A portion of the intestine occasionally protrudes through the walls of the abdomen. This may be the consequence of external violence,

the beast having been gored by one of its companions. The external wound may probably be small, or, in some cases, the skin may not be broken at all, but the internal wall of the belly is injured, and partially or entirely ruptured. In consequence of this, a tumor soon appears, varying in size according to the extent of the injury. It is a portion of the intestine that is protruding. The enlargement is tender when pressed upon, but it does not seem to interfere with the health of the animal, and a fortnight or three weeks elapse before any serious consequence is observed; at length the tumor begins to increase very rapidly; the animal expresses considerable pain on being moved, and is only comparatively easy when lying down, and even then it moans occasionally; the breathing is quickened; the countenance is anxious; the pulse is quick and small; rumination has stopped, and the usual evacuation of fæces is diminished. It is plainly a protrusion of the bowels, and now attended with some degree of strangulation, or pressure of the edges of the wound upon them, and thus obstructing the passage of their contents. The tumor is generally soft and yielding, and, on pressure, a gurgling noise is heard within it. On inspection of the cut, p. 330, and observation of the loose manner in which the small intestines are attached to the edge of the mesentery, it will be easy to account for the occasional enormous size of the tumor, and the quantity of intestine which is protruded.

It is rarely possible, by any manipulation (*taxis*), to return the bowel; and if it could be returned, it would immediately escape again. It is therefore loss of time to endeavor thus to treat the case. It would be worse than loss of time, for considerable inflammation may be set up by a long-continued and rough handling of the part.

The beast must be thrown and held on his back, with the hind parts somewhat elevated. An incision must be made through the skin, corresponding with the length of the tumor, especial care being taken that the protruded intestine, which will be found immediately underneath, be not wounded. Then, if there be any strangulation of the intestine, which in most cases there will be, the first and second fingers of the left hand must be introduced between the bowel and the edge of the wound; a crooked knife (a bistoury) must next be passed cautiously between the fingers, and the wound enlarged sufficiently to enable the protruded mass to be returned. The bowel having been thus replaced in its natural cavity, the edges of the wound through the walls of the belly must be brought together and retained with stitches; the skin, if necessary, being dissected back a little, in order to get at the whole of the wound. Stitches must then be passed through the skin, the divided edges of which should be brought together in the same manner. In a few cases it will be practicable, and always advisable when practicable, to include the skin and the muscular wall of the belly in the same stitch. A pled-

get of fine tow must be placed over the incision, and upon that another pledget, smeared with simple ointment. This must be confined by a bandage fire or six inches wider than the wound, and which must be passed twice or thrice round the body, firmly sewed, and, if possible, not removed for ten days. At the expiration of that period, the edges will be found to have adhered along the greater part of the incision, the stitches may be withdrawn, and what remains unhealed may be treated as a common wound. Should much œdematous swelling appear on either side of the bandage, the parts should be well fomented with warm water, or, if requisite, lightly scarified. The beast should be kept on rather short allowance, the food consisting chiefly of mashes, with a little hay or green meat; and a dose or two of physic should be given during the progress of the cure.

If the horn should have broken the skin, as well as lacerated the muscular part beneath, and the intestine protrudes, it must be cleared from any dirt or extraneous matter about it, then carefully returned, and the wound closed and the bandage applied as already directed.

The author has not only seen a considerable portion of bowel protruding, but the bowel itself torn. Even then he has not despaired, for the healing power in these animals is such as the human surgeon would scarcely deem possible. The rent of the intestine may be closed by a stitch or two, with well-founded hope of the edges uniting, and the intestinal canal becoming perfect and whole.

Calves are occasionally dropped with ruptures. They principally occur along the middle line of the belly, and not far from the navel. It is usually a protrusion of a portion of the omentum or caul; but in a few instances one or two small convolutions of the intestines have been involved. The principal danger is, that the rumen, when unnaturally distended by food or gas, may press upon and injure the portion of caul or intestine immediately within the abdomen, and turning over the edge of the opening. Any serious operation with a view to the reduction of the rupture would scarcely be advisable, but it would be prudent to fatten and dispose of the animal as soon as convenient.

But calves are sometimes born with rupture in the groin. The opening through which the testicle afterward descends into the bag is lax, and yields to slight pressure, and in the motions of the fœtus in the womb, a small convolution of the intestine slips down. This sometimes continues of nearly its original size for several months; in some cases it is gradually retracted, and disappears; in others, it increases in volume with greater or less rapidity. A remedy is often to be found for this as soon as the testicles descend into the bag; and at which time, if the hernia will ever be serious, it begins to increase, or to be strangulated—the beast should be castrated.

After the animal is thrown and properly confined, the protruded

intestine should be gently and carefully pushed up through the ring or opening, the testicles being somewhat drawn out, in order to render this more practicable. Continued and gentle pressure applied on the sides of the tumor will more facilitate this than the application of the greatest force. The intestine having been returned, the finger of an assistant is placed at the opening, and the operator proceeds to cut into the scrotum as quickly as he can, and to denude the testicle, to apply the ordinary clamps, and to divide the cord below the clamps. The clamps will form a temporary and effectual support; and by the following day, when it is usual to remove the clamps, a degree of inflammation and engorgement of the parts will have been set up, that will either obliterate the ring, or so far contract it, that it will be impossible for the gut afterwards to descend.

There is one circumstance to which the practitioner should most carefully attend. The protruded intestine always carries with it a portion of peritoneum—it is contained in a bag formed by the investing membrane of the bowels. The whole of this bag may not have been returned when the intestine is pushed up: the operator must ascertain this, and by no means open any part of the peritoneal covering that may remain.

Castration will usually remove this hernia and all its unpleasant or dangerous consequences, and the beast will be as valuable for grazing and for working as if nothing had occurred.

In a few cases, however, the hernia will be strangulated. So great a portion of intestine, or of fæcal matter in that intestine, will have descended, that the operator cannot return it through the abdominal ring. Even the somewhat desperate expedient of introducing the hand into the rectum, and endeavoring to find out the portion of intestine connected with that which has descended, and forcibly retract it, may fail: a different kind of operation must then be attempted, and which a skillful veterinarian alone can perform.

A species of rupture, very difficult to be treated, has occurred to cows in an advanced period of pregnancy. An excessive accumulation of fluid has taken place in the womb, or calf-bed, and the tendinous expansion of the muscles which support the lower part of the belly has given way. The farmer says, that "the rim of the cow's belly is ruptured." A portion of the womb escapes through the opening, and descends into the groin, or seems to occupy the udder, and even the head of a calf has been forced down into the groin.

There is one more species of rupture to which cattle are subject, and the existence of which cannot always be ascertained during life, namely, that of the diaphragm, or midriff. In distension of the rumen there is always great pressure against the midriff. This is increased when severe colicky pains come on, and especially when improper means have been resorted to, such as strong stimulating

drinks, or rude exercise, or when the animal, in a state of half-unconsciousness, has violently beaten himself about. The midriff has then given way, and a portion of the intestine, or of one of the stomachs, or of the omentum or caul, or of the liver, has been forced into the cavity of the chest. This may be suspected when, after the usual symptoms of hoove or colic, great difficulty of breathing suddenly comes on, and is evidently attended by excessive pain—when the animal is every moment looking at her side, and especially at the left side—when she shrinks, and bows herself up as if the muscles of the belly were violently cramped—and when she stiffens all over, and then suddely falls and dies in convulsions.

Examination after death has sometimes displayed chronic rupture of this kind. The attack has been as sudden, but the colicky pains have not been so violent; they have intermitted—disappeared; but an habitual difficulty of breathing has been left behind—disinclination to rapid motion—fright when suddenly moved—anxiety of countenance—perhaps impairment of condition—and certainly impossibility of acquiring any considerable degree of condition. This has continued during several months, until the animal has been destroyed, or has died from some cause unconnected with these symptoms; and then an old rupture of the diaphragm has been discovered, the edges of which had been completely healed, and the second stomach, or the liver, had been firmly placed against the opening, and had occupied it, and in a slight degree projected into the thorax. No medical treatment or operation could be of the slightest service in this case.

Homœopathic treatment.—In connection with the surgical means, *arnica* is to be administered very often, externally and internally. The animal must be kept quiet, and all flatulent food carefully avoided. If inflammation take place, *aconitum* should be given repeatedly. *Sulphuric acid*, diluted, may be used externally.

CHAPTER XIV.

THE URINARY ORGANS AND THEIR DISEASES.

THE KIDNEYS.

The blood contains much watery fluid, which, after it has answered certain purposes connected with digestion, or the various secretions, is separated and carried out of the frame. The kidneys are the main instruments by which this is effected; and they are often called into increased action in order to compensate for the deficiencies of other parts. When the usual discharge of perspiration from the skin is suspended, the kidney takes on increased activity; and when fluids are accumulating in the frame generally, or in particular parts, they escape by means of these organs. Also other substances, the accumulation or the continuance of which in the frame would be injurious, are got rid of by means of the kidneys. The essential principle of the urine (the *urea*) is one that would be noxious, or perhaps destructive.

The kidneys are two glandular substances, attached on either side to the spine beneath the muscles of the loins. They are not, however, exactly opposite to each other, but the left kidney is pushed somewhat backward by the great development of the rumen. A very large artery runs to each. The quantity of blood which that vessel carries shows the importance of the kidneys, and well accounts for the inflammation and other diseases to which they are occasionally subject. These arteries divide into innumerable little branches, coiled upon and communicating with each other in a singular manner; and the blood, traversing all these convolutions, has its watery and noxious ingredients separated in the form of urine, which is carried on to the bladder, while the portion that remains is returned to the circulation by means of the veins, which bear a proportionate size to that of the arteries.

As the process of digestion is so perfectly performed in cattle, and all the nutritive, and some, perhaps, of the noxious matter which the food contains, taken up and received into the circulation, the kidneys have much to do in order to complete this process of separation; they are therefore large; are complicated in their appearance; they present an assemblage of different lobes or lobules, separated by deep scissures; there are ample provisions made for their secu-

rity—they are deeply embedded in a covering of fat, and there is another accumulation of fat surrounding and defending the different vessels that are received or given off. The bulk of the rumen, and the danger of occasional pressure from it, may in some degree account for these provisions of safety; but a more satisfactory reason is to be found in the greater extent and importance of the function which these organs in cattle have to discharge.

RED-WATER.

The disease termed *red-water*, from the color of the urine, is one of the most frequent and untractable maladies of cattle. It may be conveniently divided into *acute* and *chronic;* in fact, two diseases essentially different in their symptoms, demanding different treatment, and referable to different organs, have been confounded under this name.

A cow, in somewhat too high condition, and in whom the prudent precautions of bleeding or physicking had been omitted, frequently, a week or two before the time of calving, suddenly exhibits symptoms of fever; she heaves at the flank; she ceases to ruminate, and evidently suffers much pain; her back is bowed; she is straining in order to evacuate her urine, and that is small in quantity, expelled with force, highly tinged with blood.

At other times, a few days after calving, when she had not cleansed well, or was in too good condition, and had not had that dose of purgative medicine which should always follow parturition, she suddenly manifests the same symptoms of illness, speedily succeeded by a similar discharge of bloody urine.

The nature and cause of the disease are here evident enough. During the period of pregnancy there had been considerable determination of blood to the womb. A degree of susceptibility, a tendency to inflammatory action, had been set up; and this had been increased as the period of parturition had approached, and was aggravated by the state and general fulness of blood to which she had incautiously been raised. The neighboring organs necessarily participated in this, and the kidneys, to which so much blood is sent for the proper discharge of their function, either quickly shared in the inflammation of the womb, or first took on inflammation, and suffered most by means of it.

An overdriven bullock is seized with acute inflammation of the kidneys; another that has been shifted from poor to luxuriant pasture is soon observed to have red-water. There are some seasons when it is in a manner epidemic, when a great proportion of the beasts in a certain district are attacked by it, and many of them die. Atmospheric influence has not been taken sufficiently into the account in the consideration of this and almost every other disease. It is seldom that one dairy is attacked by red-water, without many or

most of the neighboring ones being annoyed by it, and especially if the soil and the productions of the soil are similar; and even cattle in the straw-yard have not then quite escaped. It is more prevalent in the spring and autumn than in the winter, and more in the winter than in the summer: it is particularly prevalent when, in either the spring or the fall of the year, warm days succeed to cold nights and a heavy dew. It is peculiar to certain pastures: the farmer scarcely dares to turn even the cattle of the country upon some of them; and a beast brought from a distant farm or market is sure to be attacked. It oftenest occurs in woody districts, and particularly in low marshy lands; but in them there are exceptions, which, in the present state of the botanical knowledge of the farmer and the veterinarian, cannot be satisfactorily accounted for. A wall or a hedge may divide a perfectly safe pasture from another which gives the red-water to every beast that is turned upon it. One farmer scarcely knows what the disease is except by name, while on the grounds of his neighbor it destroys many a beast every year. The same pasture is safe at one time of the year and dangerous and destructive at another. The fields surrounded by copses may be stocked with impunity, or advantage, in summer or winter; but the farmer must beware of them when the buds are shooting or the leaves are falling.

The result of general experience is, that it has more to do with the nature of the food than with any other cause; and the production or the unusual growth of the astringent and acrimonious plants may have considerable influence here. The malady may with more probability be traced to the quality of the general produce of the soil, than to the prevalence of certain plants of known acrimonious or poisonous properties.

This noxious quality may be communicated by excess or deprivation of moisture. There is no farmer who is not aware of the injurious effect of the coarse rank herbage of low, and marshy, and woody countries, and he regards such districts as the chosen residence of red-water.

The farmer must carefully observe the effect of the different parts of his farm in the production of this disease; and observation and thought may suggest to him that alteration of draining or manuring, or other management, which may to a considerable degree remedy the evil.

Acute Red-water is ushered in by a discharge of bloody urine, and is *generally preceded by dysentery, suddenly changing to obstinate costiveness; and as soon as the costiveness is established the red-water appears.* There is laborious breathing, coldness of the extremities, ears and horns, heat of the mouth, tenderness of the loins, and every indication of fever: it often runs its course with fearful rapidity, and the animal is sometimes destroyed in a very few days.

When the carcass is examined, there is generally found some in-

flammation of the kidney, enlargement of it, turgescence of its vessels, yet very rarely any considerable disorganization, and certainly not so much affection of it as would be expected; but in cows the uterus exhibits much greater inflammation; there is often ulceration, the formation of fetid pus, and occasionally gangrene; there is also peritoneal inflammation, extensive, intense, with adhesions and effusions, while the lining membrane of the bowels rarely escapes inflammation and ulceration.

There can be little doubt about the treatment of such a disease. There has either been an undue quantity of blood determined to the kidneys, with much local inflammation, and before the pressure of which the vessels of that organ have given way, or so much blood has been always traversing the kidney, that there is a facility in setting up imflammation there. Bleeding will be the first step indicated. The first bleeding should be a copious one; but the repetition of it will depend upon circumstances. The hæmorrhage, or bleeding, is clearly *active*. It is produced by some irritation of the part: its color shows that it proceeds from the minute arterial or capillary vessels. When bloody urine flows from the kidney, that organ is giving way under an increased discharge of its natural function, and that function is increased in order to compensate for the suspended one of another part, namely, the natural action of the bowels. Three objects will be accomplished by venesection: the first, a diminution of the general quantity of blood; the second—a consequence of the first—the removal of congestion in the part; and the third is the giving a different direction to the current of blood.

Purgatives should follow, with a view more quickly and effectually to accomplish all these objects; and from the recollection of a circumstance most important to the practitioner, that red-water closely followed the establishment of constipation. A pound of Epsom salts should be immediately exhibited, and half-pound doses every eight hours afterwards, until the bowels are thoroughly acted upon.

There is too frequently great difficulty in purging cattle when laboring under red-water: dose after dose may be administered for three or four days, and yet the bowels will remain obstinately constipated. Either there is a strange indisposition in them to be acted upon, or, the rumen sympathizing with the derangement of other organs, the muscular pillars of its roof yield to the weight of the fluid, whether hastily or cautiously administered, and the medicine enters that stomach, and is retained there until the beast is lost. The physic must be repeated again and again; it must gently trickle down the gullet, so that it shall fall on the roof of the paunch with as little force as possible; and after the second day, in spite of the fever, unusual doses of aromatics must mingle with it, that the rumen, or the intestines, or both, may be stimulated to action. In the majority of cases, and especially before the strength of the animal be-

comes exhausted, *the commencement of purging will be the signal of recovery.*

It, nevertheless, too often happens, that the constipated state of the bowels cannot be overcome, but the animal becomes rapidly weaker, while the blood assumes a darker, and sometimes a purple or even a black color. The danger is now increased, and probably death is not far distant. In many cases, however, the beast not being too much exhausted, the dark and coffee-colored urine is a favorable symptom, especially if it be discharged in evidently larger quantities, and not so frequently.

The appearance of the darker fluid, and even the continuance of the florid red urine, when the fever has subsided to a considerable degree, will indicate a different mode of treatment. The hæmorrhage will have become *passive*. The blood will flow because the vessels have lost their power of contracting on their contents. It has then been usual to give astringents; but this is dangerous practice, for the constipation, which is the worst symptom of the disease, and which immediately preceded the red-water, and was, probably, the exciting cause of it, may be confirmed or recalled. Stimulants, and those which act upon the kidney, will be most likely to have beneficial effect. The common turpentine, the balsam of copaiba, or even spirits of turpentine, especially if it be guarded by the addition of a few drachms of laudanum, may be given with advantage. The weakened vessels of the kidney may occasionally be roused to close on their contents, and the hæmorrhage may be arrested.

Chronic red-water is more prevalent than that which is acute, and, in its first stage, is far more a disease of the digestive organs, and especially of the liver, than of the kidney. The urine is observed to be of a *brown color*, or *brown tinged with yellow*—the beast feeds nearly as well as before, but ruminates rather more lazily. In a few days a natural diarrhœa comes on, and the animal is well at once; or a purgative drink is administered, and a cure is presently effected. This occurs frequently in cows of weak constitution, and in calves.

At other times there is manifest indisposition; the animal is dull, heavy, languid—the ears droop—the back is bowed—she separates from the herd—she refuses her food—she ceases to ruminate. Presently she gets better—she rejoins her companions; but this is only for a little while. *The urine, which at first was brown, with a tinge of yellow, has now red mingling with the brown, or it is of the color of porter.* It is increased in quantity—it is discharged sometimes with ease, at other times with considerable straining—in little jets, and with additional bowing of the back. The milk diminishes—it acquires a slight tinge of yellow or brown—the taste becomes unpleasant—it spoils all that it is mingled with. The pulse is accelerated—it reaches to 60 or 70. If blood be drawn, the serum which separates from it is brown. The skin is yellow, but of a

darker yellow than in jaundice—it has a tinge of brown. The conjunctiva is also yellow, inclining to brown. The urine becomes of a darker hue—it is almost black. The animal usually shrinks when the loins are pressed upon; occasionally there is much tenderness, but oftener the beast scarcely shrinks more than he is accustomed to do when laboring under almost every disease. The belly is not so much tucked up as drawn together at the sides. There is considerable loss of condition—the legs and ears get cold—the animal is less inclined to move; there is evident and general debility. In every stage there is costiveness, and that exceedingly difficult to overcome; but, on close inquiry, it is ascertained that there was *diarrhœa at the beginning, and which was violent and fetid, and which suddenly stopped.*

Examination after death shows the skin and the cellular membrane underneath to be of a dark yellow; the fat about the belly is of the same hue, or perhaps of a lighter tinge. The first and second stomachs are full: there is no fermentation and little gas, or sour smell. The manyplus is perfectly dry—baking could hardly add to the hardness. The leaves of the manyplus cling to the food contained between them: the papillæ leave their evident indentations on the hardened mass, and that mass cannot be detached without considerable portions of the cuticle clinging to it. The fourth stomach is empty, and the lining membrane covered with brown mucus, exhibiting patches of inflammation underneath. The intestines are rarely inflamed. There is no fluid in the belly, nor inflammation of its lining membrane. The kidney is of a yellow-brown color, and sometimes a little enlarged, but *there is rarely inflammation or disease about it.* Drops of dark and brown-colored urine may be pressed from it. The lungs display no mark of dangerous disease, but they too have a yellow hue. The fluid in the bag of the heart is yellow. The chyle, which is traversing the lacteal vessels, is yellow too, and there is the same discoloration of the fluids everywhere.

The liver is evidently of a darker color; it is enlarged, generally inflamed, sometimes rotten, and filled with black blood. The gall-bladder is full, almost to distension. The bile is thick and black: it looks more like lampblack mixed with oil, than like healthy bile.

All these appearances lead to the necessary conclusion that this is far more a disease of the digestive organs than of the kidney; in fact, that it is not primarily an affection of the kidney. It is disease of the liver, either consisting in inflammation of that organ, accompanied by increased secretion of bile, or a change in the quality of the bile. In consequence of this, the whole circulatory fluid becomes tinged with the color of the bile, and which is shown in the hue of the skin generally, and in the color of the blood, and par-

ticularly in the change that takes place in that blood when drawn from the vein.

The fluid discharged from the kidneys participates in the general change; it becomes yellow—yellow-brown—brown. The change is most evident here, because so great a quantity of blood, in proportion to the size of the organ, circulates through the kidneys; and more particularly it is evident here, because it is the office or duty of the kidneys to separate from the blood, and to expel from the circulation, that which is foreign to the blood, or would be injurious to the animal.

The bile, however, possesses an acrid principle to a considerable degree. While it is an excrementitious substance that must be got rid of, it stimulates the intestinal canal as it passes along in order to be discharged; it particularly does so when it is secreted in undue quantities, or when its quality is altered. There is abundant proof of this in the bilious irritation and diarrhœa which cattle so frequently exhibit. The kidney, at length, is evidently irritated by the continued presence of this diseased fluid: it becomes inflamed, its minute vessels are ruptured, and a red hue begins to mingle with the brown. There is found discoloration and increased size of the kidney, and pain in the region of that organ; this, however, is rarely carried to any considerable extent, and the seat and principal ravages of disease are to be clearly traced to a different part, namely, the liver.

It is evident, then, that *acute* and *chronic* red-water, as the author of this treatise has termed them, (for he did not, in the present state of our knowledge of cattle medicine, dare to deviate too far from the usual arrangement and designation of disease,) are essentially different maladies: they belong to different organs—they are characterized by different symptoms—they require different treatment. The first is inflammation of the kidney; it is characterized by the evident pain and fever, and by the red and bloody urine which accompanies it in an early stage; it requires the most active treatment, and it speedily runs its course. The second is inflammation of, or altered secretion from, the liver; not often accompanied in its early stage by pain or fever; characterized by the dark brown color of vitiated bile, and more slowly, but as fatally, undermining the strength of the constitution.

As to the first step in the treatment of chronic red-water, the propriety of bleeding depends on the condition of the beast, and the degree of fever. An animal in high or in fair condition can never be hurt by one bleeding; while, on the contrary, lurking, deceptive, fatal febrile action may be subdued. If there be the slightest degree of actual fever, nothing can excuse the neglect of bleeding. The quantity taken, or the repetition of the abstraction of blood, must be left to the judgment of the practitioner.

The animal must be well purged if he is in a constipated state; or if there is already a discharge of glairy fæcal matter, the character of that must be changed by a purgative. That is the best whose effects are most speedily and certainly produced, and there is no drug more to be depended upon in both these respects than the Epsom salts. It may be alternated with Glauber's salts, or common salt, or an aperient of a different character, sulphur, may be added to it. Much good effect is often produced by this mixture of aperients. As there is either so much real costiveness—indisposition to be acted upon by purgative medicine—or so much relaxation of the floor of the œsophagean canal that the medicine falls into the rumen instead of going to its proper destination, and as the establishment of purgation seems to have so uniform and beneficial an effect in relieving the disease, the medicine that is adopted should be given in a full dose. It should consist of at least a pound of Epsom salts, and half a pound of sulphur, and this should be repeated in doses consisting of half the quantity of each, until the constipation is decidedly overcome. Stimulants would be dangerous, and astringent medicine would be actual poison in the disease.

It will not be forgotten that the precautions already recommended should be carefully observed, in order to give the physic the best chance of passing into the bowels; that the patent pump should be in frequent requisition for the administration of clysters; and that when purging is once induced, a lax state of the bowels should be kept up by means of the frequent repetition of smaller doses of the medicine. The diet should consist principally of mashes, gruel, linseed tea, fresh cut young grass, young and fresh vetches, and carrots. The conclusion of the treatment will be to administer the Epsom salts in doses of four or six ounces, as an alterative, for a few days afterward; to which, if there exist any debility, add two drachms of gentian and one drachm of ginger.

BLACK-WATER.

This is only another and the concluding stage of Red-water. When it follows the acute or inflammatory disease, it may be considered as a favorable symptom if the urine contains no prurient matter, and has no unpleasant smell. It shows that the blood is not discharged so rapidly and forcibly as it was; and that it hangs about the mouths of the vessels, or is contained in the cavity of the kidney, or in the bladder, sufficiently long to be changed from arterial to venous blood, and the practitioner will be encouraged to proceed in the course which he had adopted: but if purulent matter mingles with the black blood, it indicates the sad extent of the mischief that has been done. It is a proof of ulceration, if not of gangrene, and

shows that a degree of disorganization has taken place which must speedily terminate in death.

If, in chronic red-water, or that which depends on disease of the liver, the discharge becomes of a darker and still darker brown, until it has assumed an almost black character, it shows either that the system is loaded with a superabundance of this empoisoned secretion, and of which it cannot rid itself, or that the irritation caused by the continued presence of so acrimonious a fluid is producing inflammation, gangrene, and death, in the vessels that are filled and oppressed by it. In the last stage of the disease, when the urine assumes a darker brown or black color, no remedy seems to have any efficacy; the animal is sunk beyond recovery, and he stretches himself out and dies, as if perfectly exhausted.

Homœopathic treatment.—The principal remedy for this affection is *ipecacuanha*, of which a single dose will often suffice to remove it, when it is administered in time. When signs of inflammation already exist, we must commence with *aconitum*, which in many cases effects a cure by itself. The efficacy of *cantharides* has been proved many times by giving one or two doses each day. If the staling of blood be connected with external violence, for instance, with a blow on the loins, *arnica* is the remedy. When it depends on vesical calculus, *uva ursi* should be employed.

INFLAMMATION OF THE KIDNEYS.

Cattle are occasionally subject to inflammation of the kidneys, bearing considerable resemblance to acute red-water, but attended by more of the symptoms of pure inflammation of that organ in other animals. At first there are seldom any indications of disease beyond a straining effort in voiding the urine, and which is ejected forcibly and in small quantities, the loins being more than usually tender, and, perhaps, a little hot. In a day or two afterward, however, the beast becomes dull, and careless about his food; the difficulty of staling increases; blood is perceived to mingle with the urine; the muzzle become dry; the horns and ears cold; the pulse frequent and hard, and the breathing quickened. Diarrhœa or dysentery is now observed; the evacuations are fetid; they too are discharged with effort and in diminished quantities, and at length cease to appear.

The difficulty of passing the urine becomes rapidly greater; the beast strangely bows his back, and groans from intensity of pain; at length total suppression of urine ensues; cold sweats break out, principally about the back, sides, and shoulders, and the patient trembles all over; he moans continually, but the moaning gets lower and lower; he becomes paralyzed behind; the pulse can scarcely be felt; the animal falls; he is incapable of rising, and he dies in three or four days after the apparent commencement of the attack.

This is especially a disease of the spring time of the year. It is

the consequence of over-nourishment: there is a predisposition to inflammation; and from some cause, more or less apparent, that inflammation is directed to the kidney. The treatment will comprise plentiful bleeding, active purging, the administration of emollient clysters, fomentation over the loins or the application of a mustard poultice to them, bran mashes, gruel, and a small quantity of green succulent food. There is a connection between all these affections of the kidneys, and inflammation of the larger intestines lying in the neighborhood of them; thence the previous dysentery, and the often obstinate constipation of red-water and pure inflammation of these organs; and thence the necessity of large and repeated doses of purgative medicine, but from which all stimulating ingredients should be excluded, and which would probably, in these cases, best consist of castor or linseed oil. The clysters also should be truly emollient, that while they assist in opening the bowels, they may act as soothing fomentations in the neighborhood of the inflamed organ. Both the oil and the clysters should be continued until the inflammation has perfectly subsided. To the use of these the treatment should generally be confined—most certainly in no part of it should the slightest portion of diuretic medicine be administered.

Homœopathic treatment.—In general this disease is cured by means of *aconitum*, after which one or two doses of *cantharides* should be given. In obstinate cases, when the disease does not yield to several doses of the latter remedy, of which however more than one must not be taken during the day, we have recourse to *hyoscyamus*. *Nitrum* is also very useful. When there is obstinate constipation, *nux vomica* should be given. *Arnica* is indicated whenever the disease is attributable to an external injury.

THE KIDNEYS AND BLADDER.

The urine secreted, or separated by the kidney, having first accumulated in the cavity in the centre of that organ, is conveyed through a duct called *the ureter* to a more capacious reservoir, *the bladder*. The ureters are large; the internal membrane is strong; the opening into the bladder is near to the neck of that vessel, and the ureters terminate near to each other.

The Bladder of the ox, larger, longer, and of a more oval form than that of the cow, is lodged between the rectum and the internal surface of the lower bones of the pelvis. It is supported by a transverse ligament, which ties it to the sides of the pelvis; while it is attached by cellular membrane to the rectum above and to the pelvis below. It is confined entirely to the cavity of the pelvis, for one of the compartments of the paunch affords an insuperable obstacle to its entering the proper cavity of the abdomen. When distended by urine, its increase of size is principally shown by its greater roundness, and not by its increased length and descent into the cavity of

the belly. In examination and in operation for stone in the bladder, this should not be lost sight of. It has three coats: the outer and peritoneal; the central or muscular, and the inner coat, which is lined with numerous glands, that secrete a mucous fluid in order to defend the bladder from the acrimony of the urine.

The bladder terminates in a small neck, aronnd which is a continuation of the common muscular coat, or, in the opinion of some, a distinct circular muscle, the sphincter, whose natural state is that of contraction; so that the passage remains closed, and the urine retained, until, the bladder being stretched to a certain extent, the fluid is expelled either by the will of the animal, or the involuntary contraction of the muscular coat. This muscle is weak in the ox. Advantage may be taken of this weakness of the sphincter muscle, for in retention of urine, or when, for the purpose of some operation, it may be expedient to empty the bladder, the slightest pressure upon it by the hand introduced into the rectum will readily effect it.

Having passed the sphincter muscle, the urine flows through the *urethra* and is evacuated. This canal is long and small; it pursues a tortuous path. The peculiar form and direction of some of the muscles of that region compel the penis to take a kind of double curve, not unlike an *S*, before it takes its ultimate straight course; and on these accounts the ox suffers occasionally from the entanglement of calculi in the folds of the urethra.

The bladder of the cow is smaller and rounder than that of the ox. The rumen is as large as in the ox, and occupies the greater part of the abdomen; but additional room must be left for the impregnated uterus, and that is effected in some measure at the expense of the bladder; while also, to obviate the ill effects of occasional pressure in the distended state of the uterus, the sphincter muscle at the neck of the bladder of the cow is much larger and stronger than the same muscle in the ox.

The circumstances of disease to be considered with reference to the bladder are the foreign bodies, principally calculi, which it may contain; the inflammation resulting from that or from other causes; rupture, and inversion of it.

URINARY CALCULI.

Concretions are found in the urinary passages of cattle. One cause of their retention may be the form of the passages. Many calculi are retained in the bladder, and thus become the centre around which other matter collects, layer upon layer. It it probably on this account that calculi are found so much oftener in the ox than the cow; in the former the urethra is long and small, in the latter it is short and capacious.

The great function discharged by the kidney in cattle may likewise account for the more frequent formation of calculi. When so

much more blood passes through this organ, that the useless or excrementitious parts of it may be expelled, the supposition is reasonable that a greater portion of the substances of which urinary calculi are composed will be found. The food of cattle may have much to do with it; and the greater proportion of earthy matter which they swallow, in the first rude cropping of the herbage, and the carelessness with which they often tear it up by the root, or the earth which they sometimes voluntarily take to prevent the development of acidity in the stomach, or to remove it.

The urinary calculi that have been examined have been found to be composed of nearly the same materials, and in proportions not often varying. They have chiefly yielded carbonate of lime, a small quantity of carbonate of magnesia, some traces of phosphate of lime, and a certain quantity of mucus, which has served as cement between the different layers. The form of the calculus has considerably differed. When there has been but one central nucleus, the form has been more or less circular; but in a majority, the stone has acquired magnitude by the union of various small distinct calculi. The form of the mass has consequently been different in different specimens.

The floor of the cow-house, and sometimes bare places in the field, will show where a considerable quantity of gritty matter has been discharged. This indicates a diseased state of the urine at the time, not perhaps sufficiently serious to interfere materially with the general health, but which may eventually lead to the formation of stone in the bladder or kidney, or to other serious maladies. The sandy matter is either white, approaching to gray or yellow; or it is brown, with varying shades of red or yellow.

Chemists have now satisfactorily ascertained the nature and causes of these discharges, and the means of remedying them. The light-colored granules show deficiency, and the dark-colored prove excess, of acid in the urine. In the one there is a deposite of earthy matter from deficiency of acid, and in the other there is a crystallization of the acid itself. In the one, cream of tartar, or dilute sulphuric acid might be administered with advantage; and in the other, earth, or a portion of chalk mixed with common loam, may be placed before the beast, or doses of carbonate of soda may be given. Danger is most to be apprehended from the white deposit, which is frequently the precursor or the accompaniment of gravel—a deposition in the bladder to which cattle are far more subject than farmers or agriculturists are usually aware.

STONE IN THE KIDNEYS AND THE URETERS.

There can be no doubt that many calculi descend from the cavity or pelvis of the kindey through the ureters into the bladder; yet there is but one case of each on record.

STONE IN THE BLADDER.

It is with the calculus that has descended into the bladder and there increased in size, or that was originally formed there, that the practitioner will have most to do, either while it continues in the bladder, or in its after progress through the urethra.

The symptoms that would indicate stone in the bladder are somewhat obscure. There are many that prove plainly enough a state of suffering, and of general excitation or fever;—rumination ceases—the mouth is hot—the flanks heave—the animal is continually lying down and getting up again—it is looking mournfully towards its flank. Then comes a peculiar trembling of the hind limbs, and the frequent straining to void urine—a straining at some times quite ineffectual, at other times producing the discharge of a small quantity, and that occasionally mingled with blood. These symptoms will direct the attention of the practitioner to the urinary organs. In order to ascertain the nature of the complaint, he will introduce his hand into the rectum. The bladder will easily be detected. It will probably be distended by urine; he will gently press upon it, and the contained fluid will be expelled, and if there is a calculus in the bladder, it will be readily felt. He must not, however, be alarmed if this pressure should at first produce violent pain resembling colic—he must desist for a few minutes, and try again. A sound could not be used for the purpose of detecting the calculus, nor even the flexible catheter.

There are two courses to be pursued in such a case—either to slaughter the animal immediately, if it be should be in tolerable condition, or to remove the stone by the usual operation of lithotomy.

All attempts to dissolve the calculus by the use of muriatic or any other acid will be as fruitless as they have proved to be in the human being; and the length and small caliber of the urethra, as well as its double curve, prevent the possibility of having recourse to the safe and effectual operation of breaking down the stone within the bladder.

In the ox, on account of the length of the penis, or for other reasons, two muscles descend from the anus, and pursue their course until they arrive at about the middle of the penis, a little in front of the scrotum; there they attach themselves to the penis, and draw it up, and force it to bend or curve upon itself; and it takes, as has already been stated, the form of an inverted *S*. No stilett can be forced through such a double curvature. The operator must either cut down on the urethra, without any stilett within to guide him, at the point where again, below the anus, it curves round the pelvic bones in order to enter the pelvic cavity, and which, if he is a tolerable anatomist, and proceeds with some caution, he may readily accomplish; or he must get rid of the first curve, and that may be effected without much difficulty. The hair must be cut off immediately in front of the scrotum; a

longitudinal incision must then be made, six inches in length, through the sheath, upon the penis, and in the direction in which it lies. The penis being exposed, it is seized and drawn forward in its sheath; the muscles relax, the penis is readily brought into a straight direction, and held so for a sufficient time to admit the introduction of a stilett, which should either be composed of whalebone, and very flexible, or it should be made of iron, and jointed. The more flexible the catheter is, the more readily it will accommodate itself to the tendency of the muscles to restore the inverted *S* curve, and the more readily likewise may it be bent round the bony arch beyond, and so diminish the length of the incision which must afterwards be made between the anus and the scrotum.

The sound being passed through the curvature thus temporarily removed, and its point felt below the anus, the operator must cut into the urethra at that part. Into this opening he must introduce another rod, straight and grooved, and pass it on into the bladder; and then, by means of a probe-pointed bistoury running in this groove, the incision must be carried on to the side of the anus, and through a portion of the neck of the bladder corresponding with the supposed size of the calculus. The operator must then pass his right hand into the rectum, and the two first fingers of the left hand into the bladder, and with the right hand guide the calculus between the fingers of the left hand, by which, or by means of a pair of forceps pushed into the wound, it should be seized and extracted.

It is not always that there will be much bleeding, or that it will be necessary to take up any of the vessels, or even to pass any sutures through the edges of the wound, unless the incision has been more than usually large. The urine will for a few days be principally passed through the wound, but a portion of it will soon begin to find its ways through the urethra, and that quantity will daily increase, and, in quite as short a time as can be expected, the wound will be perfectly healed.

STONE IN THE URETHRA.

On account of the length, and narrowness, and curvature of the urethra in the ox, obstruction of that passage by a calculus is a circumstance of too frequent occurrence. The symptom which would lead to a suspicion of this, would be, in addition to the evidence of considerable pain and general irritation, a complete, or almost complete, suppression of urine. The practitioner should examine the urethra through the whole of its course anterior to the inverted *S* curve; the calculus will then be felt, or probably the protuberance caused by its presence will be immediately seen. The duty of the surgeon is now, in most cases, easily and quickly performed. An *oblique* incision must be made upon the calculus, sufficiently long to enable it to be taken out. By means of the *oblique* incision, the

calculus and the urethra are less likely to roll under the knife, and the wound will more readily heal. One or two sutures should be passed through the edges of the wound, which will speedily adhere. The operation is simple, but the danger of neglect is great; and many a beast has been lost by the bladder being distended, and continuing so until violent inflammation of its mucous coat has taken place, or it has been ruptured.

Should not the calculus be in this anterior portion of the urethra, that between the scrotum and the anus should be carefully examined; and if it be not found there, it is imprisoned somewhere in the inverted *S* curve. An incision must then be made anteriorly to the scrotum, in the manner already described; the penis drawn out; the curve for a while obliterated; the situation of the obstruction discovered; the urethra laid open at that point, and the calculus extracted.

Some veterinarians have remarked, that oxen are most subject to the formation of these calculi during the autumn and winter; and that, as the spring advances, the new grass produces a more abundant secretion of urine, and thus relaxes the urinary organs, and enables the calculi more easily to pass; while the fresh herbage gives an alkaline and soapy character to the urine, which causes some of the recently formed calculi to be dissolved in the bladder.

Homœopathic treatment.—After an operation, it is necessary to dress the wound with *arnica* water, to give some doses of this medicine internally to prevent traumatic fever, and to give one or two doses of *china*, on account of the loss of blood. The homœopathic remedy to be employed is *uva ursi*, which prevents inflammation, consequently contraction of the urethra, and assists in favoring the expulsion of the foreign body, if it have not already passed into the urethra, in which case all the medical means is in general useless. *Lycopodium* has also been tried with success.

RUPTURE OF THE BLADDER.

This is the necessary consequence of over-distension of a vessel, the coats of which are naturally weak; or it may be produced by a careless or brutal mode of casting the animal. It would not require any great shock in order to rupture the bladder, after suppression of urine had existed several days, and the coats of the bladder had begun to be weakened by inflammation.

The circumstances which would most unerringly indicate a rupture of the bladder, would be the impossibility of detecting that vessel in the pelvic cavity when the hand was introduced into the rectum; or, after the bladder had been felt, round and hard almost as a foot-ball, and the animal had been expressing in every possible way the torture he endured, a perfect calm all at once succeeding. This would probably be hailed by the inexperienced practitioner as a symptom of recovery, but the skillful one would regard it as the forerunner of

death. If a day or two had passed since the rupture of the bladder, the experienced eye would detect it by a certain engorgement of the limbs, and particularly of the hind limbs; and there would often be an evident urinous smell about the animal, even before it was dead. In such case, the bladder is commonly found in a state of gangrene; the intestines are highly inflamed, and the whole of the meat is discolored and nauseous. It is, therefore, of consequence to ascertain the state of these parts during the life of the animal, either that an operation may be attempted, or that the farmer may sell him, while there is anything about him that is saleable besides his skin. In fine, when it is recollected that the existence of these calculi betrays a constitutional tendency to their formation, and that the removal of one may at no great length of time be followed by the appearance of another; when, from the length and narrowness, and, more especially, from the singular curvature of the urethra in the ox, it is very difficult for calculi to pass; and the walls of the bladder in the ox are so weak it will become a matter for consideration, whether the beast, in good saleable condition, should not be destroyed as soon as this obstruction is clearly ascertained; and, most certainly, the animal that has been successfully operated upon for suppression of urine, and that is not then fit for the market, should be fattened, and got rid of as quickly as possible.

The cow is in a manner exempt from these sad accidents, because the calculi readily find their way through her short, and capacious, and straight urethra.

INVERSION OF THE BLADDER.

This has occasionally taken place in the violent throes of parturition. The efforts of the practitioner must then be confined to the preservation of the calf, for the bladder can never be returned to its natural situation; and although the mother might possibly survive the removal of this vessel, yet as the urine must continue to be secreted, and to be got rid of, and, trickling down her legs, would produce constant soreness and ulceration, she would ever be a nuisance to herself, and a digusting object to those who had the care of her.

CHAPTER XVI.

PREGNANCY, PARTURITION, AND THE DISEASES CONNECTED WITH THEM.

ABORTION, OR SLINKING.

The usual period of pregnancy in a cow is nine calendar months, and something over; but there is often considerable variation in the time of what seems to be a natural delivery, and when the calf is likely to live.

M. Tessier, in a Memoir read to the Royal Academy of Science at Paris, says, that in one thousand and thirty-one cows, which he had the opportunity of observing, the shortest period of gestation was two hundred and forty days, and the longest three hundred and twenty-one—difference, eighty-one days; and counting from nine months, fifty-one days over, and thirty days under. The average is about two hundred and eighty-five days.

The cow, however, is, more than any other animal, subject to abortion. This takes place at different periods of pregnancy, from half of the usual time to the seventh, or almost to the eighth month. The symptoms of the approach of abortion, except the breeder is very much among his stock, are not often perceived; or, if perceived, they are concealed by the cow-herd, lest he should be accused of neglect or improper treatment.

The cow is somewhat off her feed—rumination ceases—she is listless and dull—the milk diminishes or dries up—the motions of the fœtus become more feeble, and at length cease altogether—there is a slight degree of enlargement of the belly—there is a little staggering in her walk—when she is down she lies longer than usual, and when she gets up she stands for a longer time motionless.

As the abortion approaches, a yellow or red glairy fluid runs from the vagina—(this is a symptom which rarely or never deceives)—her breathing becomes laborious and slightly convulsive. The belly has for several days lost its natural rotundity, and has been evidently falling—she begins to moan—the pulse becomes small, wiry, and intermittent. At length labor comes on, and is often attended with much difficulty and danger.

If the abortion have been caused by blows or violence, whether

from brutality, or the animal being teased by other cows in season, or oxen, the symptoms are more intense. The animal suddenly ceases to eat and to ruminate—is uneasy, paws the ground, rests her head on the manger while she is standing, and on her flank when she is lying down—hæmorrhage frequently comes on from the uterus, or when this is not the case, the mouth of the uterus is spasmodically contracted. The throes come on, are distressingly violent, and continue until the womb is ruptured. Should not all these circumstances be observed, yet the labor is protracted and dangerous.

Abortion is sometimes singularly frequent in particular districts, or on particular farms. It seems to assume an epizootic or epidemic form. This has been accounted for in various ways. Some have imagined it to be contagious. It is destructively propagated among the cows, but this is probably to be explained on a different principle than that of contagion. The cow is an animal considerably imaginative, and highly irritable during the period of pregnancy. In abortion, the fœtus is often putrid before it is discharged; and the placenta, or afterbirth, rarely or never immediately follows it, but becomes decomposed, and, as it drops away in fragments, emits a peculiar and most noisome smell. This smell seems to be singularly annoying to the other cows—they sniff at it, and then run bellowing about. Some sympathetic influence is exercised on their uterine organs, and in a few days a greater or less number of those that had pastured together likewise abort. Hence arises the rapidity with which the fœtus is usually taken away and buried deeply, and far from the cows; and hence the more effectual preventive of smearing the parts of the cow with tar or stinking oils, in order to conceal or subdue the smell; and hence, too, the ineffectual preventing of removing her to a far distant pasture.

The pastures on which the blood or inflammatory fever is most prevalent are those on which the cows oftenest slink their calves. Whatever can become a source of general excitation and fever is likely, during pregnancy, to produce inflammation of the womb: or whatever would, under other circumstances, excite inflammation of almost any organ, has at that time its injurious effect determined to this particular one.

There is no farmer who is not aware of the injurious effect of the coarse, rank herbage of low, marshy, and woody countries, and he regards these districts as the chosen residence of red water; it may be added, that these districts are also the chosen residence of abortion.

Hard and mineral waters are justly considered as laying the foundation of many diseases in cattle, and for abortion among the rest.

Some careful observers have occasionally attributed abortion to the disproportion in size between the male and female. Farmers used to be too fond of looking out for a great overgrown bull for their dairy or breeding cows, and many a heifer or little cow was seri-

ously injured: she either cast her calf, or was lost in parturition. This error has been long exploded among the breeders of sheep; and breeders of cattle are beginning to act more wisely.

Cows that have been long affiicted with hoose, and that degenerating into consumption, are exceedingly subject to abortion. They are continually in heat—they rarely become pregnant, or if they do, a great proportion of them cast their calves. When consumption is established, and the cow is much wasted away, she will rarely retain her calf during the natural period of pregnancy.

An in-calf beast will scarcely have hoove to any considerable extent without afterwards aborting. The pressure of the distended rumen seems to injure or destroy the fœtus. Even where the distension of the stomach does not wear a serious character, abortion often follows the sudden change from poor to luxuriant food. Cows that have been out and half-starved in the winter, and incautiously turned on rich pasture in the spring, are too apt to cast their calves from the undue general or local excitation that is set up; and, as has been already remarked, a sudden change from rich pasture to a state of comparative starvation will produce the same effect, but from an opposite cause. Hence it is that when this disposition to abort first appears in a dairy, it is usually in a cow that has been lately purchased. Fright, from whatever cause, may produce abortion. There are singular cases on record of whole herds of cows slinking their calves after being terrified by an unusually violent thunder-storm. Commerce with the bull soon after conception is a frequent cause of abortion. The casting of the calf has already been attributed to the sympathetic influence of the effluvia from the decomposing placenta: there are plenty of instances in which other putrid smells have produced the same effect, and therefore the inmates of crowded cow-houses are not unfrequently subject to this mishap.

The use of a diseased bull will occasion abortion, and the calves will be aborted in a diseased state.

Besides these tangible causes of abortion, there is the mysterious agency of the atmosphere. There are certain seasons when abortion is strangely frequent and fatal; while at other times it in a manner disappears for several successive years.

There is no doubt that this must be added to the number of epidemic diseases.

The consequences of premature calving are frequently of a very serious nature. It has been stated that there is often considerable spasmodic closure of the mouth of the uterus, and that the calf is produced with much difficulty and pain, and especially if a few days have elapsed after the death of the young one. When this is the case, the mother frequently dies, or her recovery is much slower than after natural parturition. The coat continues rough and staring for

a long time—the skin clings to the ribs—the appetite does not return, and the milk is dried up. Some internal chronic complaint now takes its rise, and the foundation is laid for consumption and death.

When the case is more favorable, the results are, nevertheless, very annoying. The cow very soon goes again to heat, but in a great many cases she fails to become pregnant; she almost certainly does so if she is put to the bull during the first heat after abortion. The heat again and again returns, but she does not stand to the bulling; and so the season is wasted, while she becomes a perfect nuisance by continually worrying the other cattle.

If she should come in calf again during that season, it is very probable that about the same period of utero-gestation, or a little later, she will again abort; or that when she becomes in calf the following year, the same fatality will attend her. Some say that this disposition to cast her young one gradually ceases; that if she does miscarry, it is at a later and still later period of pregnancy; and that, in about three or four years, she may be depended upon as a tolerably safe breeder: he, however, would be exceedingly inattentive to his interest who kept a profitless beast so long.

The calf very rarely lives, and in the majority of cases it is born dead or putrid. If there should appear to be any chance of saving it, it should be washed with warm water, carefully dried, and fed frequently with small quantities of new milk, mixed, according to the apparent weakness of the animal, either with raw eggs or good gruel; while the bowels should, if occasion requires, be opened by means of small doses of castor oil. If any considerable period has to elapse before the natural term of pregnancy would have expired, it will usually be necessary to bring up the little animal entirely by hand.

The treatment of abortion will differ little from that of parturition, presently to be described. If the farmer has once been tormented by this pest in his dairy, he should carefully watch the approaching symptoms of casting the calf, and as soon as he perceives them, should remove the cow from the pasture to a comfortable cow-house or shed. If the discharge be glairy, but not offensive, he may hope that the calf is not dead: he will be assured of this by the motion of the fœtus, and then it is possible that the abortion may yet be avoided. He should hasten to bleed her, and that copiously, in proportion to her age, size, condition, and the state of excitation in which he may find her; and he should give a dose of physic immediately after the bleeding. The physic beginning to operate, he should administer half a drachm of opium and half an ounce of sweet spirit of nitre. Unless she is in a state of great debility, he should allow nothing but gruel, and he should beep his patient as quiet as he can. By these means he may occasionally allay the general or local irritation that precedes or causes the abortion, and the cow may yet go to her full time.

Should, however, the discharge be fetid, the conclusion will be that the fœtus is dead, and must be got rid of, and that as speedily as possible. Bleeding may even then be requisite, if much fever exist; or, perchance, if there be debility, some stimulating drink may not be out of place. In other respects the animal must be treated as if her usual time of pregnancy had been accomplished.

Much may be done in the way of *preventing* the formation of this habit of abortion among cows. *The fœtus must be got rid of immediately.* It should be buried deep and far from the cow-pasture. Proper means should be taken to hasten the expulsion of the placenta. A dose of physic should be given; the ergot of rye, as hereafter to be described, should be administered; the hand should be introduced, and an effort made, cautiously and gently, to detach the placenta: all violence, however, should be carefully avoided, for considerable and fatal hæmorrhage may be speedily produced. The parts of the cow should be well washed with a solution of the chloride of lime, and this should be injected up the vagina, and also given internally. In the mean time, and especially after the expulsion of the placenta, the cow-house should be well washed with the same solution, in the manner that was recommended when the treatment of the malignant epidemic was under consideration.

The cow, when beginning to recover, should be fattened and sold. This is the first and the grand step towards the prevention of abortion, and he is unwise who does not immediately adopt it. All other means are comparatively inefficient and worthless. Should the owner be reluctant to part with her, two months at least should pass before she is permitted to return to her companions. Prudence would probably dictate that she should never return to them, but be kept, if possible, on some distant part of the farm.

Abortion having once occurred on the farm, the breeding cows should be carefully watched. Although well fed, they should not be suffered to get into too high condition. Unless they are decidedly poor and weak, they should be bled between the third and fourth months of pregnancy, and a mild dose of physic should be administered to each. If the pest continues to reappear, the owner should most carefully examine how far any of the causes of abortion that have been detected may exist on his farm, and exert himself in carefully removing them.

Homœopathic treatment.—Abortion seldom takes place suddenly: in general it is announced by several symptoms, among which may be noticed great disturbance, anxiety, depression of the mother, sudden diminution of her milk, and the escape by the vagina of a fetid mucous fluid. If these precursors have been themselves preceded by any external violence, abortion is but still more probable, and we must hasten to prevent it. This is the reason why, after a blow, or a fall, there should be given without delay one or two

doses of *arnica*, and if the cause has been a luxation or false step, *rhus toxicodendron;* should the precursory symptoms still show themselves, *pulsatilla* is the chief remedy; after it, *sabina* and *secale cornutum*. Lastly, if the abortion has really taken place, and the placenta delays from four to six hours, we must give *sabina*, or better still *secale cornutum*, which generally brings on the desired result. We should have recourse to manual interference only in case these means should fail.

SYMPTOMS OF PREGNANCY.

The symptoms of pregnancy in its early stage used to be thought exceedingly unsatisfactory. The period of being in season (which generally lasts three or four days, and then ceases for a while, and returns in about three weeks) might entirely pass over; and although it was then probable that conception had taken place, yet in a great many instances the hopes of the breeder were disappointed. It was not until between the third and fourth month, when the belly began to enlarge, or in many cases considerably later, and when the motions of the fœtus might be seen, or at all events felt by pressing on the right flank, that the farmer could be assured that his cow was in calf. That greatest of improvements in veterinary practice, the application of the ear to the chest and belly of various animals (in order to detect by the different sounds—which, after a short time, will be easily recognized—the state of the circulation through most of the internal organs, and consequently the precise seat and degree of inflammation and danger), has now enabled the breeder to ascertain the existence of pregnancy at as early a stage of it as six or eight weeks. The beating of the heart of the calf will be distinctly heard, twice or more than twice as frequent as that of the mother; and each pulsation will betray the singular double beating of the fœtal heart. This will also be accompanied by the audible rushing of the blood through the vessels of the placenta. The ear should be applied to the right flank, beginning on the superior part of it, and gradually shifting downward and backward. These sounds will soon be heard, and cannot be mistaken.

TREATMENT BEFORE CALVING.

Little alteration needs to be made in the management of the cow for the first seven months of pregnancy; except that, as she has not only to yield milk for the profit of the farmer, but to nourish the fœtus which is growing in her womb, she should be well, yet not too luxuriantly, fed. The half starved cow will not adequately discharge this double duty, nor provide sufficient nutriment for the calf when it has dropped; while the cow in high condition will be dangerously disposed to inflammation and fever, when, at the time of parturition, she is otherwise so susceptible of the power of every

stimulus. If the season and the convenience of the farmer will admit of it, she will be better at pasture, at least for some hours in the day, than altogether confined to the cow-house.

At a somewhat uncertain period before she calves, there will be a new secretion of milk for the expected little one; and under the notion of somewhat recruiting her strength, in order better to enable her to discharge her new duty, but more from the uniform testimony of experience that there is danger of local inflammation and of general fever, garget in the udder, and puerperal fever, if the new milk descends while the old milk continues to flow, it has been usual to let the cow *go dry* for some period before parturition. Farmers and breeders have been strangely divided as to the length of this period. It must be decided by circumstances. A cow in good condition may be milked much longer than a poor one. Her abundance of food renders a period of respite almost unnecessary; and all that needs to be taken care of is that the old milk should be fairly gone before the new milk *springs*. In such a cow, while there is danger of inflammation from the sudden rush of new milk into a bag already occupied, there is also considerable danger of indurations and tumors in the teats from the habit of secretion being too tong suspended. The emaciated and overmilked beast, however, must rest awhile before she can again advantageously discharge the duties of a mother.

Were the period of pregnancy of equal length at all times and in all cows, the one that has been well fed might be milked until within a fortnight or three weeks of parturition; while a holiday of two months should be granted to the poorer beast; but as there is much irregularity about this, it may be prudent to take a month or five weeks as the average period.

The process of parturition is one that is necessarily accompanied by a great deal of febrile excitement; and therefore when it nearly approaches, not only should a little care be taken to lessen the quantity of food, and to remove that which is of a stimulating nature, but a mild dose of physic, and a bleeding regulated by the condition of the animal, will be very proper precautionary measures.

A moderately open state of the bowels is necessary at the period of parturition in the cow. During the whole time of pregnancy her enormous stomachs sufficiently press upon and confine the womb; and that pressure may be productive of injurious and fatal consequences, if at this period the rumen is suffered to be distended by unnutritious food, or the manyplus takes on that hardened state to which it is occasionally subject. Breeders have been sadly negligent here.

NATURAL LABOR.

The springing of the udder, or the rapid enlargement of it from the renewed secretion of milk—the enlargement of the external

parts of the bearing (the former, as it has been said by some, in old cows, and the latter in young ones)—the appearance of a glaring discharge from the bearing—the evident dropping of the belly, with the appearance of leanness and narrowness between the shape and the udder—a degree of uneasiness and fidgetiness—moaning occasionally—accelerated respiration—all these symptoms will announce that the time of calving is not far off. The cow should be brought near home, and put in some quiet, sheltered place. In cold or stormy weather she should be housed. Her uneasiness will rapidly increase—she will be continually getting up and lying down—her tail will begin to be elevated, and the commencement of the labor-pains will soon be evident.

The natural progress of parturition should not be unnecessarily interfered with. The cow should be frequently looked at, but not disturbed. Although her pains may not be so strong as could be wished, she should not be too closely approached or examined until the water-bladder, or bag containing the fluid in which the calf has hitherto floated, has protruded and is broken. Soon afterward it may be proper to ascertain whether the calf is "*coming the right way.*" In the natural presentation of the fœtus, the calf may be considered as couching or lying on its belly; its fore-legs protruding into the passage, its head lying upon them, or being a little between them, and reaching down about as far as the knees, and the back of the calf corresponding with or opposed to the back of the mother.

While the throes continue tolerably strong, the farmer or practitioner should have patience, although the progress of the labor may be tediously slow. Nature will at length safely accomplish her object. But if the pains are evidently diminishing, and hour after hour has passed and the calf protrudes little or not at all more than it did, assistance should be rendered. A pint of sound ale, or a little spirit, warmed, should be given in an equal quantity of gruel; warm gruel should be frequently administered, or at least put within the animal's reach; and access to cold water should be carefully prevented.

To the first pint of ale or some spirit, should be added a quarter of an ounce of the ergot of rye (spurred rye), finely powdered; and the same quantity of the ergot, with half a pint of ale, should be repeated every hour until the pains are reproduced in their former and natural strength, or the labor is terminated.

MECHANICAL ASSISTANCE.

The power of medicince failing, recourse should be had to mechanical assistance. Twelve hours or more having elapsed from the commencement of the labor, this should be done, even although the calf may continue to be alive; and it should not be deferred one

moment after it is ascertained that the fœtus is dead. Even now, however, the cow should not be disturbed more than is absolutely necessary; and it cannot be too deeply impressed on the mind of the farmer, that the frequent habit of rousing the poor animal, and driving her about, while she is in the act of calving, or even before the labor begins, is an unnatural, brutal, and dangerous one.

Mr. Skellett, in his work on "the Parturition of the Cow," (a truly valuable one as it regards the point now under consideration, the mechanical assistance that can be rendered in difficult and protracted labor,) observes, "As the business proceeds, and the pains increase in strength and rapidity, she confines herself to a lying posture, and in this posture she is delivered of the calf. When we reflect on this conduct of the animal, left to herself, we cannot too much reprobate the advice of those who recommend the driving her in the act of calving, or immediately before it takes place. The author has known a great many instances where it has proved the death of the cow, by producing inflammation and all its bad consequences. Every rational man will agree that the above practice is both cruel and inconsistent; for the animal herself, as soon as the hours of calving come on, immediately leaves the rest of the flock, and retires to some corner of the field, or under a hedge, in order to prevent the other cows or anything else coming near, that may disturb her in bringing forward her young."

If the head be sufficiently advanced to be grasped by the hands, or for a hand to be introduced by the side of it so as to urge it forward, an assistant at the same laying hold of the fore-legs, and pulling with moderate force at each of the throes of the mother, the little animal may often be brought forward without endangering its life. If, however, it be firmly impacted in the passage, a cord with a slip knot should be fastened round each leg, immediately above the fetlock, and a third cord around the lower jaw. Greater power may then be applied, the persons holding the cords pulling in concert, accommodating themselves to the natural pains of the mother, and exerting their strength, although somewhat forcibly, yet quietly and gradually. Here again the brutal violence resorted to by some persons is much to be reprobated; it inevitably destroys the calf, and endangers the life of the mother. If the fœtus cannot be extracted by moderate force, one of the shoulders should be *slipped* (taken off,) which may easily be effected by means of a small knife curved like those used for pruning, so as to be easily introduced into the passage in the hollow of the hand, and there used without danger of wounding the cow. An incision should be made in the fore-arm of the fœtus, and the skin elevated and turned back by means either of the knife or the fingers. The shoulder may then be easily detached from the body and drawn out; and the bulk of the calf being thus materially lessened, the remainder of it will be readily extracted.

UNNATURAL PRESENTATION.

It will soon be evident whether the calf is in the right position. The appearance of the feet and the situation of the head will be satisfactory on this point; but from fright, or violence, or some unknown cause, the position of the fœtus is sometimes strangely altered, so as to render its extraction difficult or impossible.

In some cases, although the throes rapidly succeed each other and are not deficient in power, nothing, or perhaps only the mere hoofs, protrude from the vagina. This must not be suffered long to continue, for if it does, the strength of the cow will be rapidly wasted. The hand and arm, having been well oiled, must be introduced into the passage, in order to ascertain the position of the fœtus. The whole of the passage being probably well occupied by the head or fore-limbs, and the uterus and the vagina powerfully contracting, the arm of the operator will receive very considerable and benumbing pressure; and sometimes to such an extent that the perfect feeling of the limb will not be restored until some hours have passed. This must not be regarded, but the surgeon must steadily, yet not violently, push the arm forward, taking care that he does not wound the cow with his nails.

If he find the fore-feet far up the passage, and the head between them, but sunk down below the bones of the pelvis, he will immediately perceive that the extraction of the calf is impossible while it remains in this position. He will therefore pass a cord with a slip-knot round each of the feet, and then push them back into the womb. Next, with the slip-knot of a third cord in his hand, he will push back the whole of the fœtus gradually, but firmly, until he is able to get his hand under the head and elevate it and pass the noose round the lower jaw: then, grasping the upper jaw and endeavoring thus to raise the muzzle above the rim of the pelvis, his assistants will draw the three cords, and easily bring the head and the feet into the passage in the natural position.

If the head be not depressed between the feet, but bent down on one side below the passage, cords must be put round the fore-feet, and they are to be returned as in the other case. The head is to be sought out, and a noose passed round the jaw, and then the operator putting his hand against the chest of the fœtus and pushing it back, his assistants are to gently draw the three cords, until the head and the feet are properly placed. Great care should, however, be taken, that in drawing out the fore-feet the womb is not injured by the hoofs; they should generally be brought forward separately, and guarded by the hand of the operator within the womb. If there should be insuperable difficulty in raising and bringing the head round, and the calf be dead, the skin must be turned back from one of the legs, beginning at the fore-arm and reaching the shoulder, as

already described, and the shoulder detached, which, considering the weakness of the muscles and ligaments at that age, will be readily effected. The assistant then pulling steadily at the legs, and the surgeon forcing the chest back into the belly, the extraction of the fœtus will rarely be difficult.

It may happen that after many thoes no portion of the fœtus appears, but the calf is found turned in the womb, with his back resting on the belly of the mother, the feet against the spine, the head depressed below the bones of the pelvis, and the poll pressing against these bones. To turn the calf in this position will be difficult, and often impossible; but, cords having been fastened, as before, to the feet and the lower jaw, the hand should be introduced under the head, so as to raise it in some measure, and enable the assistants, by means of the cords, to bring it and the feet into the passage. If the fœtus should be dead, or the life of the mother appear to be in danger, it will be very easy, while in this position, to separate one or both shoulders, and the head may then be readily brought out.

It is not uncommon for the tail alone to be seen at the mouth of the passage. This is a breech presentation, and a very dangerous one. The calf cannot be expelled by the natural throes of the mother, the doubling of the hind-legs offering an insuperable obstacle; nor will it be possible for the fœtus to be turned in the womb. The hand must be introduced; one of the hocks searched out, and the noose end of a cord brought round it: next, the free end of the cord must be carried in and passed through the noose, which is to be tightened and fixed above the hock. The operator must then press against the breech, forcing the calf backward and upward, while the assistants draw the hock to the commencement of the passage by means of the cords. The surgeon should then shift his hand down to the hoof, in order to guard the uterus, as the foot is brought over the ridge of the pelvis. The other hock being afterwards drawn from under the fœtus in the same way, the birth may be easily accomplished.

The birth being effected, the practitioner should examine the womb, in order to ascertain the state of the placenta, and whether there is a second calf. The case of twins will not often give the practitioner much trouble, for the calves are generally small and easily brought through the passage, unless they should both present themselves at the same time; therefore, at the commencement of every labor, the surgeon should carefully ascertain whether the parts presenting may not belong to two distinct calves; in which case one must be pushed back until the other is delivered, for in the attempt to extract them both together, the mother and the calves would inevitably perish.

FREE-MARTINS.

The opinion has prevailed among breeders from time out of date,

that when a cow produces two calves, one of them a bull-calf and the other a heifer-calf, the male may become a perfect and useful bull, but the female will be incapable of propagation, and will never show any desire for the bull. The curious name of *free-martin* has been given to this animal. That accurate inquirer, Mr. John Hunter, spared no pains or expense to ascertain the real foundation of this belief; and he availed himself of the opportunity of examining three of these free-martins. In all of them there was a greater or less deviation from the external form and appearance of the cow; and in the head and the horns some approach to those of the ox; while neither of them had shown any propensity to breed. The teats were smaller than is usual in the heifer; but the outward appearance of the bearing was the same.

They were slaughtered, and he examined the internal structure of the sexual parts: he found in all of them a greater or less deviation from the form of the female, and the addition of some of the organs peculiar to the male; and he ascertained that they were in fact *hermaphrodites.*

It is not then a mere vulgar error that the female twin is barren; On the other hand, there are several well-authenticated instances of these free-martins having bred.

It would hence appear that the rule is, and a very singular anomaly in natural history it is, that the female twin is barren, because she is an hermaphrodite; but in some cases, there not being this admixture of the organs of different sexes, or those of the female prevailing, she is capable of breeding. If the free-martin have entirely the appearance of a cow, she will breed; if she be coarse in the horn, and ox-like, she will be barren.

There have been instances of the cow producing three and even four calves at one birth.

THE CÆSARIAN OPERATION.

Some practitioners have lately recommended, in desperate cases, the opening of the side of the mother, and the extraction of the calf. The circumstances must indeed be desperate which can justify such a procedure. If, at the very earliest period of parturition, the veterinary can ascertain that there is a malformation of the pelvis, which will render delivery in a manner impossible, and the breed is a valuable one, and the mother, with this malformation, would never again be useful as a breedieg cow, and no violent attempts have been made to extract the fœtus—nothing has been done which could set up inflammation, or give a disposition to inflammatory action; or if it can be clearly ascertained that there is a deformity in the fœtus, an enlargement of the head, or a general bulkiness, which will forbid its being extracted either whole or piecemeal, the practitioner might be justified in attempting this serious operation; but in a later stage of

the process, when the usual measures have been adopted—when the parts have been bruised and injured, and the animal has been fatigued and worn out, and the fœtus itself probably has not escaped injury, such an operation can scarcely be defended on any principle of science or humanity. The writer of this work has twice attempted the operation, but in neither case did he save either the mother or the calf; nor is he aware of any English veterinarian who has succeeded. There is an account of one successful case by M. Chretien, but it is one only out of the several that he attempted, and he attempted this, because, on examination, he found that there was a hard tumor in the womb, which nearly half filled the cavity of the pelvis, and forbade the possibility of delivery.

If a similar impossibility of delivery should occur in the practice of the veterinary surgeon; and equally justifying the experiment, the operation must be thus performed. The rumen must first be punctured at the flank, or some of the solution of the chloride of lime introduced, in order to get rid of any gas which it contains, and thus to bring the uterus better into view, and prevent as much as possible that pressure on it, and on the intestines, which will usually cause a troublesome and dangerous protrusion of them as soon as an incision is made into the belly. The animal is then to be thrown on the left side and properly secured; the right hind-leg, being detached from the hobbles, must be brought as far backwards as possible, and fixed to some post or firm object, so as to leave the right flank as much exposed as it can be. Commencing about two inches before and a little below the haunch-bone, an incision is now to be made through the skin, six or seven inches long, in a direction from above downward, and from behind forward, and this incision is afterwards to be carried through the skin, and the muscular wall of the flank. A bistoury being taken and two fingers introduced into the wound in order to protect the intestines, the wound is to be lengthened five or six inches more over the superior and middle part of the uterus.

At this moment, probably, a mass of small intestines may protrude; they must be put a little on one side, or supported by a cloth, and the operator must quickly search for the fore-feet and head of the fœtus. An incision must be made through the uterus, of sufficient length to extract the calf, which must be lifted from its bed, two ligatures passed round the cord, the cord divided between them, and the young one, if living, consigned to the care of a stander-by, to be conveyed away and taken care of. The placenta is now to be quickly yet gently detached, and taken away. The intestines are to be returned to their natural situation, the divided edges of the uterus brought together and retained by means of two or three sutures, the effused blood sponged out from the abdomen, and the muscular parietes likewise held together by sutures, and other sutures passed through the integuments. Dry soft lint is then to be placed over the

incision, and retained on it by means of proper bandages, and the case treated as consisting of a serious wound.

EMBRYOTOMY.

In cases of malformation of the calf, or when, as now and then happens, the powers of nature seem to be suddenly exhausted, and no stimulus can rouse the womb again to action, the destruction of the fœtus, should it still live, and the removal of it piecemeal, is a far more humane method of proceeding, and much oftener successful. All that will be necessary will be a very small kind of pruning knife, already described, with the blade even a little more curved than those knives generally are, and that can be carried into the passage in the hollow of the hand with scarcely the possibility of wounding the cow. A case related by M. Thibeaudeau will best illustrate this operation. "I amputated the left shoulder of the fœtus, in spite of the difficulties which the position of the head and neck presented. Having withdrawn this limb, I made an incision through all the cartilages of the ribs, and laid open the chest through its whole extent, by means of which I was enabled to extract all the thoracic viscera. Thus having lessened the size of the calf, I was enabled, by pulling at the remaining fore-leg, to extract the fœtus without much resistance, although the head and neck were still bent upon the chest. The afterbirth was removed immediately afterwards. A cow the neck of whose uterus was so constricted that the finger could scarcely be introduced; I divided the stricture, and saved both cow and calf."

INVERSION OF THE WOMB.

In the convulsive efforts in order to accomplish the expulsion of the fœtus, the womb itself sometimes closely follows the calf, and hangs from the bearing, as low as or lower than the hocks, in the form of a large red or violet-colored bag. This is called "*the down-fall of the calf-bag.*" It should be returned as soon as possible, for there is usually great pressure on the neck of the womb, which impedes the circulation of the blood, and the protruded part quickly grows livid and black, and is covered with ulcerated spots, and becomes gangrenous and mortified; and this is rapidly increased by the injury which the womb sustains in the continual getting up and lying down of the cow in these cases.

The womb must first be cleansed from all the dirt which it may have gathered. If much swelling has taken place, and the bag looks thickened and gorged with blood, it should be lightly yet freely scarified, and the bleeding encouraged by warm fomentations. While this is done, it should be carefully ascertained whether there is any distension of the rumen, and if there is, either the common puncture for hoove should be made in the flank, or a dose of the solution of the

chloride of lime adminstered. A distended rumen would form an almost insuperable obstacle to the return of the uterus. Two persons should now support the calf-bag by means of a strong yet soft cloth, while, if the placenta yet remains attached to it, a third person gently separates it at every point. It would be useless to attempt to return the womb until the cleansing is taken away, for the labor pains would return as violently as before. The operator will carefully remove the little collections, or bundles of blood-vessels, which belong to the fœtal portion of the placenta, and which are implanted into the fleshy excrescences, that, for some reason, never yet fully explained, grow upon the surface of the impregnated womb, and gradually disappear again after the birth of the calf. If much bleeding attend this process, the parts are to be washed with a weak mixture of spirit and water. The bleeding being a little stayed, and every thing that may have gathered round the calf-bag being removed, the assistants should raise the cloth, and bring the womb on a level with the bearing; while the surgeon, standing behind, and having his hand and arm well oiled, and a little oil having been likewise smeared over the womb generally, places his right hand, with the fingers bent or clenched, against the bottom—the very inferior and farther part of that division or horn of the uterus which contained the fœtus, and forces it through the passage, and as far as he can into the belly; and there he retains it, while, with the other hand, he endeavors likewise to force up the smaller horn, and the mouth of the womb. He will find considerable difficulty in effecting this, for the strainings against him will often be immense, and sometimes, when he thinks he has attained his object, the whole will again be suddenly and violently expelled. A bleeding from the jugular, and the administration of a couple of drachms of opium, will materially lessen these spasmodic efforts. The surgeon must, in spite of fatigue, patiently persist in his labor until his object is accomplished; and he will be materially assisted in this by having the cow either standing, or so placed on straw that her hinder parts shall be considerably elevated.

The practitioner should be careful that the parts are returned as nearly as possible into their natural situation, and this he will easily ascertain by examination with the hand. Much of the after quietness of the animal, and the retention of the womb thus returned, will depend upon this.

Although the return of the parts to their natural situation may be tolerably clearly ascertained, yet it will be prudent to provide against a fresh access of pain and another expulsion of the uterus. For this purpose it had been usual to pass three or four stitches of small tape through the lips of the bearing; but this is a painful thing, and sometimes difficult to accomplish; and the cases are not unfrequent when these stitches are torn out, and considerable laceration and inflammation ensue.

A collar should be passed round the neck of the cow, composed of web: a girth of the same material is then put round the body behind the shoulders, and this is connected with the collar, under the brisket and over the shoulder, and on each side. A second girth is passed behind the first, and a little anterior to the udder, and connected with the first in the same way. To this, on one side, and level with the bearing, a piece of stout wrapping cloth or other strong material, twelve or sixteen inches wide, is sewed or fastened, and brought over the bearing, and attached to the girth on the other side in the same manner. A knot on each side will constitute the simplest fastening, and this pressing firmly on the bearing will effectually prevent the womb from again protruding. If it should be necessary, another piece may be carried from below the bearing over the udder to the second girth, and a corresponding one, slit in order to pass on each side of the tail, may reach from above the bearing to the upper part of the second bandage.

The cow should be kept as quiet as possible; warm mashes and warm gruel should be allowed; bleeding should again be resorted to, and small doses of opium administered if she should be restless, or the pains should return; but it will not be prudent during the first day to give either those fever medicines, as nitre and digitalis, which may have a diuretic effect and excite the urinary organs, or to bring on the straining effect of purging, by administering even a dose of saline medicine. Should twenty-four hours pass and the pains not return, the stitches may be withdrawn from the bearing, or the bandage removed.

Homœopathic treatment.—The operation, returning the womb, being concluded, administer *arnica* internally, and throw up injections of *arnica* water, which are very advisable, more especially when the accident has been occasioned by difficult parturition, or when the extractions of the after-birth have injured the womb. When there is fever, and an inflammatory state, administer forthwith a couple of doses of *aconitum*. If the accident have been produced by great efforts in parturition, we must have recourse to *sepia* and to *platina*; and, if it make its appearance a little after calving, especially when the mother is lying down, benefit will be derived from *china* (two doses each day). *Pulsatilla* and *sepia* are specifics when the fall of the womb has been occasioned by efforts made to expel the placenta; if the anus has become depressed, *cocculus* would appear more particularly useful.

RUPTURE OF THE UTERUS.

Another more serious evil sometimes accompanies inversions of the womb, namely, a laceration or rupture of that organ, effected either by the unusually strong contraction of the womb, or by the violence with which the feet of the calf are drawn forward in the unskillful treat-

ment of false presentation, or by the general concussion which accompanies the expulsion of the womb. The laceration is sometimes a foot in length, and is generally found on one side, and not far from the bottom of the uterus.

The animal needs not to be abandoned even in such a case, although there will be considerably more difficulty in returning the womb, because the same pressure cannot be made with the doubled hand on the bottom of it, and that difficulty may be increased by the furious state of the beast suffering much intensity of pain, and the whole frame disordered by such an accident. No time should be lost in vain efforts to bring the lacerated parts together and secure them by stitches; but, the womb having been well cleaned, the placenta removed, and the bleeding somewhat stayed, it must be returned as well and as speedily as can be managed, and the bandage applied, or the lips of the bearing secured by stitches: the cow should then be bled, and opiates administered. Nature will often do wonders here—the mischief will be repaired—the uterus will become whole again, and that without a tenth part of the fever that might be expected; and there are instances upon record in which the cow has suckled her calf, and produced another a twelvemonth afterwards.

Rupture of the uterus may occur without protrusion of the part. from the too powerful action of that organ. The symptoms are obscure—they have not yet been sufficiently observed. They would probably be gradual ceasing of the labor pains—coldness of the horns and ears and mouth—paleness of the mouth—a small and accelerated pulse—swelling of the belly, and the discharge of bloody, glairy, fetid matter from the shape. Nothing can be done in such a case.

Homœopathic treatment—This will be the same as for mere inversion of the womb.

PROTRUSION OF THE BLADDER.

In long protracted labor, accompanied by pains unusually violent, the bladder has protruded. If the calf be not already born, it must be extricated as quickly as the case will admit, and that without scrupulous regard to the safety of the cow; for the protruded bladder can never be returned to its natural situation—in consequence of pain and inconvenience, the animal can never afterwards carry high condition, but will be a miserable and disgusting object as long as she lives.

RETENTION OF THE FŒTUS.

It may happen that the pains of parturition gradually abate, and at length cease. If the cow has been much exhausted or injured by the continuance of the labor, or the efforts made to relieve her, and

the fœtus has been wounded or broken, and considerable inflammation and fever have been set up, she will probably die: but if she is no more exhausted than may be naturally expected, and the fever is slight, and she eats a little, she should not be abandoned.

Mr. King relates an instructive case of this kind:—A few years ago I was called to see a heifer which appeared to be rather losing condition, and which had been observed occasionally to void some offensive matter from the vagina. Before I could get to her, some portion of a calf's fore-extremity came away. The owner was very apprehensive of her not doing well, and earnestly pressed the extraction of the remainder of the fœtus. On examination, I found the os uteri so small and contracted, that I could not pass my hand; and as the beast ate and drank, and was so little, either locally or constitutionally, disturbed, I persuaded him to leave her to nature, watching her in case of assistance being required. He consented, and, by degrees, and in detached portions, the greater part, or perhaps the whole of the calf (she was not confined) came away, and she did well, and became fat.

The same gentleman relates another case: A cow, healthy, fine, and fat, was slaughtered. The uterus was found to contain the skeleton of a calf almost entire, all the soft parts having separated, and wholly escaped. Nothing of her history was known. There is an instance on record of the head of a calf (all the other parts having passed away unobserved) being retained in the womb eighteen months. Pains resembling those of parturition then came on. The veterinary surgeon, on examination, detected a hard round body which he mistook for a calculus, and which was so firmly imbedded in the womb that he was compelled to have recourse to a bistoury in order to detatch it. In a fortnight she seemed to be well.

ATTENTION AFTER CALVING.

Parturition having been accomplished, the cow should be left quietly with the calf; the licking and cleaning of which, if it be soon discharged, will employ and amuse her. It is a cruel thing to separate the mother from the young so soon; the cow will pine, and will be deprived of that medicine which nature designed for her in the moisture which hangs about the calf; and the calf will lose that gentle friction and motion which helps to give it the immediate use of all its limbs, and which increases the languid circulation of the blood, and produces a genial warmth in the half exhausted and chilled little animal. A warm mash should be put before her, and warm gruel, or water from which some of the coldness has been taken off. Two or three hours afterwards it will be prudent to give an aperient drink consisting of a pound of Epsom salts and two drachms of ginger. This may tend to prevent milk fever and garget in the udder. Attention should likewise be paid to the state of the udder. If the

teats are sore, and the bag generally hard and tender, she should be gently but carefully milked three or four times every day. The natural and the effective preventive of this, however, is to let the calf suck her at least three times a day if it be tied up in the cow-house, or to run with her to the pasture, and take the teat when it pleases. The tendency to inflammation of the udder is much diminished by the calf frequently sucking; or should the cow be feverish, nothing soothes or quiets her so much as the presence of the little one.

THE CLEANSING.

The placenta, or *after-birth*, or *cleansing*, should be discharged soon after the calving. It soon begins to act upon the uterus as a foreign body, producing irritation and fever: it likewise rapidly becomes putrid and noisome, and if it be then retained long, it is either an indication of the weakly state of the cow, or it may produce a certain degree of low fever that will interfere with her condition. Every cow-leech, therefore, has his cleansing drink ready to administer; but it is too often composed of stimulating and injurious drugs, and which lay the foundation for after disease. The aperient drink recommended to be given after calving, with the addition of half a pint of good ale to it, will be the best assistant in this case, and the only thing that should be allowed.

Should the cleansing continue to be retained, some have recommended that a weight of six or eight ounces should be tied to the cord, the gentle and continual action of which will usually separate the placenta from its adhesions, without any risk of hæmorrhage: but if the after-birth should still remain in the womb, and decomposition should evidently commence, the hand must be introduced into the passage, and the separation accomplished as gently as possible.

There is, however, a great deal more fear about this retention of the after-birth than there needs to be, and it is only the actual appearance of inconvenience or disease resulting from it that would justify a mechanical attempt to extract it. It is occasionally retained seven or eight days, without any dangerous consequence.

Homœopathic treatment..—The after-birth does not always come away immediately; it sometimes remains either entirely or in part in the womb, a circumstance which might bring on fatal consequences. The means to be employed in such a case have been already mentioned under the head ABORTION. Experience has ascertained the efficacy of several other remedies for the anamolies which may occur during the act of parturition; *chamomilla*, *pulsatilla*, and *cannabis*, when the cow does not lie down, when she is restless, and the pains properly so called are not sufficiently marked; *secale cornutum*, in case of convulsions and excessive straining; *pulsatilla*, when the pains are too slight to advance the labor; *opium* in case

of complete atony. *Aconitum* and *chamomilla* are useful when the milk is slow in making its appearance; *arnica*, when the labor has caused the animal to suffer much; and *nux vomica*, when the lumbar region afterwards appeared much weakened.

BLEEDING (FLOODING) FROM THE WOMB.

This, although rarely, may follow natural parturition. It is oftener seen when the uterus has been wounded in the forcible extraction of the calf, and it still more frequently follows the long retention and mechanical separation of the after-birth. The application of cold to the loins will be most serviceable in this case. A pound of nitre should be dissolved in a gallon of water, and the loins and bearing of the cow kept constantly wet by means of cloths dipped in the solution. The water yielded by the melting of ice mixed with salt may be used, being colder, and therefore more effectual. The cow may drink cold water, and in any quantity that she may be inclined to take, and large doses of opium (two drachms every second hour) should be administered. The hinder parts of the cow should be elevated, in order that the blood may be retained in the womb, and coagulate there. She should be kept perfectly quiet, and the calf not permitted to suck. There are few hæmorrhages from the womb, except those produced by absolute rupture of it, which will not yield to this treatment.

Homœopathic treatment.—Give *arnica* internally; throw injections of *arnica* water into the womb, and give *china* to combat debility from loss of blood.

MILK (PUERPERAL) FEVER—DROPPING AFTER CALVING.

Although parturition is a natural process, it is accompanied by a great deal of febrile excitement. The sudden transferring of powerful and accumulated action from one organ to another—from the womb to the udder—must cause a great deal of constitutional disturbance, as well as liability to local inflammation.

The cow, after parturition, is subject to inflammation of some of the parts the functions of which are thus changed: it is mere local inflammation at first, but the system speedily sympathizes, and puerpeal fever appears. It is called *dropping after calving*, because it follows that process, and one of the prominent symptoms of the complaint is the loss of power over the motion of the hind limbs, and consequent inability to stand. In a great number of cases, loss of feeling accompanies that of voluntary motion; and no sense of pain is evinced, although the cow is deeply pricked in her hind limbs.

There are few diseases which the farmer dreads more, and that for two reasons; the first is, that the animal now labors under a high degree of excitement, and every local inflammation, and particularly near the parts in which the sudden change of circulation

and of function has taken place, assumes a peculiar character, and an intensity, obstinacy, and fatality, unknown at other times: the second reason is, that from his inattention to the animal, or his ignorance of the real nature of the disease of cattle, he does not recognize this malady until its first and manageable state, that of fever, has passed, and the strength of the constitution has been undermined, and helpless debility has followed. The first symptom which he observes, or which the practitioner has generally the opportunity to observe, is the prostration of strength which violent fever always leaves behind it. The early deviations from health are unobserved by the farmer, and probably would not always attract the attention of the surgeon.

This disease is primarily inflammation of the womb, or of the peritoneum, but it afterwards assumes an intensity of character truly specific. The affection is originally that of some peculiar viscus, but it soon is lost in a peculiar general inflammatory state, as rapid in its progress as it is violent in its nature, and speedily followed by a prostration of vital power that often bids defiance to every stimulus.

Cows in high condition are most subject to an attack of puerperal fever. Their excess of condition or state of plethora disposes them to affections of an inflammatory character at all times, and more particularly when the constitution labors under the excitement accompanying parturition. The poorest and most miserable cattle have, however, sometimes had milk fever after calving; and they have particularly done so when, on account of the approach of this period, they have been moved from scanty to luxuriant pasture, or from low keep to high stall feeding. Milk fever happens to cows that are very fresh and fat, and particularly to those that calve far on the season in hot weather; but cows that are too fat often drop after calving in the winter; and it is observed that the cases that occur in the winter will frequently recover, while the animals that are thus attacked in hot weather too generally die.

A cow is comparatively seldom attacked with milk fever at her first calving, because in the present system of breeding she has seldom attained her full growth, and therefore the additional nutriment goes to increase of size instead of becoming the foundation of disease. Cases, however, do occur, in which cows of three years old have been speedily carried off by this complaint, but then they had been most injudiciously exposed to the forcing system.

Much depends on the quantity of milk which the cow is accustomed to yield; and great milkers, although they are not often in high condition, are very subject to this affection. All cows have a slight degree of fever at this time; a very little addition to that will materially interfere with the secretion of milk, and, perhaps, arrest it altogether; and the throwing back upon the system the

quantity of milk which some of them are disposed to give, must strangely add fuel to the fire, and kindle a flame by which the powers of nature are speedily consumed. Whether the present improved method of selection, whereby the properties of grazing and giving milk are united in the same animal, will increase the tendency to inflammation, and particularly to this dangerous species of fever, is a question deserving of consideration.

Puerperal fever sometimes appears as early as two hours after parturition; if four or five days have passed, the animal may generally be considered as safe: yet a fortnight has elapsed between the calving and the fever.

The early symptoms of fever are evidently those of a febrile character. The animal is restless, shifting her feet, pawing, and she heaves laboriously at the flanks. The muzzle is dry and hot, the mouth open and the tongue protruded. The countenance is wild, and the eyes staring. She wanders about mournfully lowing; she becomes irritable; she butts at a stranger, and sometimes even at the herdsman. Delirium follows; she grates her teeth, foams at the mouth, throws her head violently about, and, not unfrequently, breaks her horns. The udder becomes enlarged, and hot, and tender, at the very commencement of the disease. This is always to be regarded as a suspicious circumstance in a cow at that time; and if this swelling and inflammation be accompanied, as they almost uniformly are, by a partial or total suspension of the milk, that which is about to happen is plain enough.

The disease is an inflammatory one, and must be treated as such, and being thus treated, it is generally subdued without difficulty. The animal should be bled, and the quantity of blood withdrawn should be regulated by that standard so often referred to—that rule without an exception—the impression made upon the circulation. From six to ten quarts will probably be taken away, depending upon the age and size of the animal, before the desired effect is produced. There is no malady which more satisfactorily illustrates the necessity of endeavoring to subdue as quickly as possible every inflammatory complaint of cattle by the free use of the lancet; for all of them run their course with a rapidity which a person unaccustomed to these animals, and which the human practitioner, especially, would scarcely deem to be possible. To-day the cow is seen with the symptoms just described—she is bled, and she is relieved; or she is neglected, and the fever has sapped the strength of the constitution, and left a fearful debility behind. The small bleedings to which some have recourse are worse than inefficient, for they only increase the natural tendency of these maladies to take on a low and fatal form.

A pound or a pound and a half of Epsom salts, dependent on the size of the beast, must next be administered, with half the usual quantity of aromatic ingredients; and half-pound doses of the same

must be repeated every six hours. Should not the medicine soon begin to act, the usual quantity of aromatic medicine must be doubled, for in addition to the constipation usually attending fever, there is that which arises from the occasional state of the rumen, and the passage leading to it, and that insensible stomach must be roused to action and excited to discharge its contents, in despite of the stimulating influence of the spice on the constitution generally. *The bowels must be opened*, or the disease will run its course; and, purging once established in an early stage, the fever will, in the majority of instances, rapidly subside, leaving the strength of the constitution untouched.

After the physic has begun to operate, the usual sedative medicines should, if necessary, be given.

The digestive function first of all fails when the secondary and low state of fever comes on. The rumen ceases to discharge its food, and that being retained, begins to ferment, and the paunch and the intestines are inflated with fetid gas, and the belly of the animal swells rapidly.

Next, the nervous system is attacked—the cow begins to stagger. The weakness is principally referable to the hinder quarters, and rapidly increases. She reels about for a while, and then falls; she gets up, falls again, and at length is unable to rise; her head is bent back toward her side, and all her limbs are palsied; and now, when in too many cases no good can be done, the proprietor, for the first time, begins to be alarmed.

The duration of this second stage of puerperal fever is uncertain; but although it is usually more protracted than the first, the period in which hope may be reasonably encouraged is short indeed. If the cow be seriously ill, and off her feed, and does not get up again in two or three days, the chances are very much against her; the author, however, knew one that was saved after she had suffered considerable fever, and had been down nine days; and where debility is the principal symptom, and the cow seems to lie tolerably comfortable, and without pain, and picks a little, she may occasionally get up after she has been down even longer than that.

The treatment of this stage of the disease, although there has been a great deal of dispute about it, depends on one simple principle—the existence and the degree of fever. Notwithstanding there is debility, there may be fever; although the strength of the constitution may have been to a great degree wasted, there may be still a smothered fire that will presently break out afresh. In another point of view, much of this apparent weakness may be deceptive; it may be the result of oppression and venous congestion, and not of exhaustion.

The pulse will be the guide, and should be carefully consulted. Is it weak, wavering, irregular, dying away, pausing a beat or two, and

then weakly creeping on again? We must not bleed here. These are indications of debility that cannot be mistaken—nature wants to be supported, stimulated, not still further weakened. The abstraction of blood would kill at once.

Is the pulse small, but regular, hard, wiry, and quickened—or is it full and quickened? Blood should certainly be taken away. These are as plain indications of secret and destructive fire as can possibly be given. The practitioner should bleed, but with the finger on the pulse, anxiously watching the effect produced, and stopping at the first falter of the heart. Many a beast has been decidedly saved by this kind of bleeding in puerperal fever; and many have been lost through neglect of bleeding. Some may have perished when the bleeding was carried too far, and some, if the animals were bled when the pulse gave indications of debility, but none when the pulse indicated power, and the possibility of febrile action.

The propriety and impropriety of the abstraction of blood depends on the state of the pulse and the degree of fever—circumstances which vary in every case, and in different stages of the same case, and which accurate observation alone can determine.

Next, in order of time, and first of all in importance in this stage of the disease, stands physic. The bowels must be opened, otherwise the animal will perish; but the fever having been subdued by a judicious bleeding, and the bowels after that being excited to action, the recovery is in a manner assured. The medicine should be active, and in sufficient quantity; for there is no time for trifling here. A scruple of the farina of the Croton-nut, and a pound of Epsom salts, will constitute a medium dose. For a large beast the quantity of the salts should be increased. Doses of half a pound should afterwards be given every six hours until purgation is produced. The usual quantity of aromatic medicine should be added. Here, too, the constitution of the stomachs of cattle should not be forgotten. If twenty-four hours have passed, and purging has not commenced, even after the administration of such a drug as the Croton-nut, there is reason to suspect that the greater part of our medicine has not got beyond the rumen; and on account of the cuticular and comparatively insensible lining of this stomach, strong stimulants must now be added to the purgative medicine, in order to induce it to contract upon and expel its contents. Two drachms each of ginger, gentian, and carraway powder, with half a pint of old ale, may, with advantage, be given with each dose of the physic.

Warm water, with Epsom salts dissolved in it, or warm soap and water, will form the best injection, and should be thrown up frequently, and in considerable quantities.

Should the constipation obstinately continue, it may be worth while to inject a considerable quantity of warm water into the rumen, and thus soften and dissolve the hard mass of undigested food, and

permit the medicine to come more effectually into contact with the coats of the stomach. The warm water would also stimulate the stomach to contract, and thus get rid of a portion of its contents, either by vomiting or purging. In the first case, there would be room for the exhibition of more purgative medicine; in the other, the effect most of all desired would have been obtained.

The rumen will often annoy the practitioner in another way in this complaint: either on account of a vitiated secretion in that stomach, or from the retention of the food, which, exposed to the united influence of warmth and moisture, begins to ferment, there will be considerable extrication of gas, and the animal will swell with even more rapidity and to a greater extent than in simple hoove. The flanks should immediately be punctured, or the probang introduced, in order to permit the carburetted hydrogen to escape. A dose of the solution of the chloride of lime, as already recommended under "Hoove," should be given, to prevent the extrication of more gas; and a greater quantity of aromatic and fever medicine should be added to the purgative, that the stomach may be roused to healthy action.

Ere this the practitioner will have thought it necessary to pay some attention to the comfort of the patient. This part of medical treatment is too often neglected. She should have been watched before she actually dropped, and got as soon as possible into the house, and well and warmly littered up. If she drops in the field, it will always be difficult to get her home; and if she continues out, and bad weather comes on, she will assuredly be lost. She should be placed on one side, or, if possible, on her belly, inclining a little to one side, and, as much as can be managed, in her usual position, and with her fore parts a little elevated, and she should be secured in that position by trusses of straw. She should be moved or turned morning and night, in order to prevent soreness and excoriation. Warm gruel and water should be frequently offered to her, and if these are obstinately refused, she should be moderately drenched with thick gruel. Bean and malt mashes may be given with a little sweet hay: but it must be remembered, that while moderate nourishment is necessary to recruit her strength and support her through such a disease, yet the digestive powers have usually shown that they have shared in the debility of the frame, and must not be too early or too much taxed.

Having well opened the bowels and subdued the fever, the future proceedings must be regulated by the state of the patient. In general, little more will be necessary than attention to diet and comfort. At all events, tonics and stimulants should not be too hastily given. It should be recollected, that the disease was essentially of a febrile nature. Experience will convince the practitioner, that there long remains a lurking tendency to the renewal of febrile ac-

tion, and he will beware lest he kindles the fire afresh; but if the cow should continue in a low and weakly state, and especially if her remaining strength should seem to be gradually declining, gentian and ginger may be administered twice in the day, in doses of half an ounce of the first and a quarter of an ounce of the second; but the outrageous quantities of aromatics and bitters, and ardent spirits, that are occasionally given, cannot fail of being injurious.

It occasionally happens that the cow appears to recover a portion of strength in her fore-quarters, and makes many ineffectual attempts to rise, but the hind-quarters are comparatively powerless. This partial palsy of the hind extremities is the natural consequence both of inflammation of the womb and of the bowels. The best remedy is a plaster. All embrocations are thrown away on the thick skin of the cow, and the constant stimulus of a plaster and the mechanical support afforded by it, will alone effect the desired purpose. A week or ten days should be given to the animal, in order to see whether the power of voluntary motion in these limbs will return; but should the paralytic affection then remain, a sling must be contrived, by which she may be supported, and during the use of which she may be enabled gradually to throw a portion of her weight upon these legs, and re-accustom them to the performance of their duty.

A very singular variety of the disease has already been hinted at. The cow is down, but there is apparently nothing more the matter with her than that she is unable to rise; she eats, and drinks, and ruminates as usual, and the evacuations are scarcely altered. In this state she continues from two days to a fortnight, and then she gets up well.

There is a common consent amongst the different organs of the frame both under healthy and diseased action. It has been stated that a partial or total suppression of the secretion of milk is frequently an early symptom, and, in some stage or other, an almost invariable one, of the disease. Experience likewise shows that if the secretion of milk can be recalled, the restoration of the use of the limbs is not far distant. The teats should be frequently drawn, and the discharge of milk industriously solicited. This is a simple method of cure, but it is a far more effectual one than many imagine.

That milk-fever is sometimes epidemic, there is every reason to suppose. The practitioner may, perhaps, be long without a case, but if one comes under his notice, he has reason to suspect that it will soon be followed by others.

That there is a constitutional tendency to this complaint, cannot be denied. Beasts in high condition are peculiarly subject to it; and an animal that has once experienced an attack of it becomes exceedingly liable to the disease at her next, or at some future calving. Agriculturists are perfectly aware of this; and if a cow recovers

from puerperal fever, her milk is dried, and she is fattened and sold without much loss of time.

Something may be done in the way of prevention. If the cow be in a high, and consequently a dangerous state of condition, and has been fed on luxuriant pasture, it will be very proper, as has been already stated, to bleed her, and give her a dose of physic, and remove her to a field of shorter bite, a little before her expected time of calving. Many valuable animals have been saved by this precaution.

Homœopathic treatment.—The first thing to be done, is to administer, within three or four hours, three or four doses of *aconitum*, which generally effect a perceptible calm. Then have recourse to *pulsatilla* and *nux vomica*. *Belladonna* is also an excellent remedy, particularly in cases of very painful swelling of the belly, and of retention of the placenta. *Chamomilla* restores the secretion of milk. Paralysis of the hind-quarters will generally yield to *nux vomica ;* but if it does not, then it will disappear under the influence of *rhus toxicodendron.*

SORE TEATS.

Cows are very subject to inflammation of the udder soon after calving. The new or increased function which is now set up, and the sudden distension of the bag with milk, produce tenderness and irritability of the udder, and particularly of the teats. This in some cases shows itself in the form of excoriations or sores, or small cracks or chaps, on the teats, and very troublesome they are. The discharge likewise from these cracks mingles with the milk. The cow suffers much pain in the act of milking, and is often unmanageable. Many a cow has been ruined, both as a quiet and a plentiful milker, by bad management when her teats have been sore. It is folly to have recourse to harsh treatment, to compel her to submit to the infliction of pain in the act of milking ; she will only become more violent, and probably become a kicker for life ; if by soothing and kind treatment she cannot be induced to stand, nothing else will effect it. She will also form a habit of retaining her milk, which will very speedily and very materially reduce its quantity. The teats should be fomented with warm water, in order to clean them and get rid of a portion of the hardened scabbiness about them, the continuance of which is the cause of the greatest pain in the act of milking ; and after the milking, the teats should be dressed with the following ointment :—Take an ounce of yellow wax, and three of lard, melt them together, and when they begin to get cool, well rub in a quarter of an ounce of sugar of lead and a drachm of alum finely powdered.

GARGET, OR SORE BAG.

Too often, however, the inflammation assumes another and worse

character: it attacks the internal substance of the udder—one of the teats or the quarters becomes enlarged, hot, and tender—it soon begins to feel hard, it is knotty; it contains within it little distinct hardened tumors or kernels. In a short space of time, other teats or other quarters probably assume the same character. The milk has coagulated in the bag to a certain degree, and it has caused local inflammation where it lodges. This occurs particularly in young cows, after their first calving, and when they are in a somewhat too high condition, and it is usually attended by a greater or less degree of fever.

The most effectual remedy for this, in the early stage of the complaint, is a very simple one; the calf should be put to the mother, and it should suck and knock about the udder at its pleasure. In most cases this will relieve her from the too great flow of milk, and disperse all the lumps.

If the inflammation continues or increases, or the bag should be so tender that the mother will not permit the calf to suck; and especially should the fever evidently increase, and the cow refuse to eat, or cease to ruminate, and the milk become discolored, and mixed with matter or with blood, the case must be taken seriously in hand. The cow should be bled; a dose of physic administered; the udder well fomented; the milk drawn gently but completely off, at least twice in the day, and an ointment, composed of the following ingredients, as thoroughly rubbed into the bag as the cow will permit. (Rub down an ounce of camphor, having poured a tea-spoonful of spirit of wine upon it; add an ounce of mercurial ointment, and half a pound of elder ointment, and well incorporate them together.) Let this be applied after every milking, the udder being well fomented with warm water, and the remains of the ointment washed off before the next milking.

If the disease does not speedily yield to this treatment, recourse must be had to iodine, which often has admirable effects in diminishing glandular enlargements. The only objection to iodine, and which renders it advisable to give the camphoretted mercurial ointment a short trial, is that while, by its power of exciting the absorbents of the glands generally to action, it causes the dispersion of unnatural enlargements, it occasionally acts upon and a little diminishes the gland itself. This, however, rarely happens to any considerable degree, and will not form a serious objection to its use when other means have failed. It should be applied externally, in the form of an ointment, (one part of the hydriodate of potash being saturated with seven parts of lard,) one or two drachms of which should be rubbed into the diseased portion of the udder, every morning and night. At the same time the hydriodate may be given internally, in doses gradually increased from six to twelve grains daily.

The udder should be frequently examined, for matter will soon be-

gin to form in the centre of these indurations, and should be speedily evacuated, lest it should burrow in various parts of the bag, and, when at length it does find its way to the surface and bursts through the skin, irregular ulcers should be formed, at all times difficult to heal, and sometimes involving the loss of more than one of the quarters. Whenever there is any appearance of suppuration having commenced, (a minute observation will enable the practitioner to discover the very spot at which the tumor is preparing to point,) the diseased part should be freely and deeply lanced, and an immense quantity of matter will often be discharged. It is generally bad practice to cut off the teat; not only is it afterwards missed in the milking, but the quantity of the milk is usually lessened to a greater or less degree.

Should the tumor have been left to break, a deep and ragged ulcer will then be formed, and must immediately be attended to, for the neighboring part will be rapidly involved. Half of the bag has in some cases become mortified in a few days, and diseased portions have either dropped off, or it has been necessary to remove them in order to stop the spread of the gangrene. The chloride of lime is an invaluable application here. The wound should be well cleaned with warm water, and then a dilute solution of the chloride freely applied to every part of it; not only will the unpleasant smell from the ulcer be immediately got rid of, but its destructive progress will be arrested, and the wound will speedily take on a healthy character. When this is effected, recourse may be had to the Friar's balsam; but the occasional use of the chloride will be advantageous until the bag is perfectly healed.

Chronic indurations will sometimes remain after the inflammation of garget has been subdued; they will be somewhat tender, and they will always lessen the quantity of milk obtained from that quarter. The iodine will seldom fail of dispersing these tumors. The ointment just recommended should be well rubbed in twice every day, and if the enlargement does not speedily subside, the hydriodate should also be given internally.

The causes of garget are various; the thoughtless and unfeeling exposure of the animal to cold and wet, at the time of or soon after parturition, the neglect of physic or bleeding before calving, or suffering the cow to get into too high condition, are frequent causes. So powerful is the latter one, that instances are not unfrequent of cows, that have for some time been dried, and of heifers that have never yielded milk, having violent inflammation of the udder. The hastily drying of the cow has given rise to indurations in the udder that have not easily been removed. An awkward manner of lying upon and bruising the udder is an occasional cause; and a very frequent one is the careless habit of not milking the cow clean, but leaving a portion in the bag, and the best portion of the milk too, and which gradually becomes a source of irritation and inflammation

in the part. Connected with this last cause is the necessity of the advice already given, to milk the cow as clean as possible, at least twice in the day, during the existence and treatment of garget.

Homœopathic treatment.—1. *Inflammatory tumefaction.*—A little time before and after calving, particularly in the first birth, often too at other periods, there is observed on the udder a painful inflammatory swelling: the organ is hard, tense, hot and red; the entire, or only a part, is affected with swelling. The animal has rather high fever, a sharp thirst, the mouth is dry, and there is but little appetite; the secretion of milk is more or less diminished. This disease is produced by different causes. The most common are contusion, stings of insects, cold, the too prolonged retention of milk, &c. Some say it has been occasioned by too little exercise. If it has been caused by external injury, frequently moistening the part with *arnica* water is sufficient to cure it; a dose of it should also be taken internally every day. *Arsenicum* should be employed only when the disease has been neglected, or when there have supervened gangrenous inflammation or ill-conducted ulcerations with hard and everted edges. After cold, the cure is readily obtained by *aconitum* at first, then *bryonia;* if the latter does not suffice, *dulcamara. Chamomilla* also has frequently proved useful. *Belladonna* has been found a specific in the treatment of erysipelatous inflammation. However, others recommend *arnica, camphora, phosphorus* and *silicea.* In the inflammation which comes on a little before or after calving, *belladonna* and *chamomilla* are specifics; *chamomilla* more especially when nodosities are felt in the organ, without the external integuments participating in it. If the inflammation passes into gangrene, or produces malignant ulcers, *arsenicum* should be administered; if, gangrene having supervened, the skin readily becomes detached, *secale cornutum* should be employed. *Silicea* also produces good effects in obstinate ulcers; *asafœtida* and *mercurius vivus* in treating unhealthy suppuration. We may also in such a case recommend *cabor vegetabilis, calcarea carbonica,* and *pulsatilla,* the latter more especially when fistulous sores begin to form.

The abnormal swelling of the udder, especially when caused by cold or moisture, yields to lotions repeated several times a day with camphoretted brandy.

2. *Induration.*—This proceeds from the same causes as inflammation, and may also result from internal causes. It is or is not accompanied with pains and suppression of milk: the latter often assumes a bad color, or undergoes some other change, becomes granular and puriform. If the indurations are painful and consist of rounded tubercles, they are resolved in ten or twelve days, either by *bryonia* (one dose morning and evening), or by *chamomilla,* chiefly when the tumor yields a crackling noise on being touched. If the cause has been an external injury, we must have recourse to a few

doses of *arnica*, then to *conium*. The indurations, both those that are painful as well as those which are indolent, with glandular swellings in the interior of the udder, yield to *chamomilla*, or, when they are very hard and obstinate, to *aconitum* and *mercurius vivus*. The nodosities which succeed an inflammation are to be treated with *camphora*, *chamomilla*, and *conium*, of each two doses at the interval of two days. If resolution does not take place, *hepar sulphuris* (one dose morning and evening) causes them to break, generally at the end of thirty-six hours.

3. *Warts.*—Warts, which are often produced in consequence of internal disease on the bellies of the cows in great numbers, spread occasionally even to the udders; besides their repulsive appearance, they prevent the animal from being milked. The remedy against those which are flat, dry, and not pediculated, is *dulcamara: thuja* is the remedy for those which are cut and mangled, oozing, and suppurating: *causticum* has been more than once useful in the treatment of bleeding warts, and those which suppurate and are painful. Sometimes the wart gives place to an ulcer with everted edges, in which case we must have recourse to *arsenicum*.

4. *Wounds.*—There are often produced in the teats circular cracks or chaps, which occasion to the animal great pain, and which, though often caused by the brutality of the cow-herds, are attributable in many cases to a morbid internal state. Those of the latter species require the employment of *sulphur* internally, to be continued for a considerable time. In all other circumstances, fomentations with *arnica* water are sufficient.

MILK-SICKNESS, OR TREMBLES.

This disease, peculiar to America, and limited to a portion of the valley of the Mississippi, has been reserved for this place, on account of the *name* by which it is universally known. In cattle it is not a disease of the udder, or its connections. It takes its name from the illness produced in man by the use of the milk of cattle diseased by the eating of some wild plant or vegetable, or the drinking of water poisoned by minerals.

Dr. Graff, of Illinois, in the American Jounal of Medical Science, April 1841, says:—

The only name by which it is known, is that which I have used, which is quite objectionable, as it may serve to convey an erroneous impression by the supposition that milk only could produce it; whereas the flesh of an infected animal acts with an equal degree of violence and rapidity.

It is a disease peculiar to the United States, occurring seldom, if ever, to the eastward of the Alleghany mountains. It is in a greater or less degree met with in all the Western States, as far south as the

Mississippi, and extends north to the boundary. The States of Indiana and Illinois are most subject to its occurrence, whilst its existence in the bordering States is comparatively rare.

Its occurrence or prevalence is confined to no season, or description of weather, existing in a like degree in the heat of summer or cold of winter, and with like virulence and frequency during a dry or wet season.

We will first speak of the *symptoms* manifested in cattle affected with it, as it is only through them that we have yet found the disease communicated to man. This may be affected to such a degree as that their flesh and milk will produce the disease, and yet they themselves manifest no unhealthy symptoms whatever. This latent condition of the disease may be discovered by subjecting the suspected animal to a violent degree of exercise, when, according to the intensity of the existing cause, it will be seized with tremors, spasms, convulsions, or even death. This is a precaution practised by butchers in these countries, always before slaughtering an animal in anywise suspected of the poisonous contamination. An ordinary degree of exertion will not develope these phenomena unless it produce the symptoms usually preceding a fatal termination. When, for instance, a cow is sufficiently deeply affected, nothing peculiar is observed until immediately preceding the outbreak of the fatal symptoms. She is then observedto walk about, with out any apparent object in view; all food is refused, and there is evidence of impaired vision. The eye is first of a fiery appearance, increasing to a deep red color, until the animal is observed to stagger and fall, when, if she rises, the trembling of the whole muscular system will prevent the maintenance of the standing position. The animal usually dies after repeated convulsions, never lingering beyond a few hours. Often it falls suddenly, as if it received a blow from a heavy body on the head, and death is produced in a few minutes.

The cause of this disease of animals is as yet shrouded in mystery and uncertainty. No satisfactory account of its nature has yet been given, and it has in turn been supposed to be of vegetable, mineral, and even aerial origin. The limits of its prevalence is not often over a large and continuous tract of country, but rather circumscribed, and surrounded by localities never known to produce it. No example is known in which the property of producing the disease has been acquired by any locality which did not previously possess it. The boundaries which were at the first discovery of the country found to separate the infected from the healthy districts, remain unchanged. The locality which serves to produce the disease, most commonly extends as a vein of variable breadth, traversing the country for a considerable distance. It can be traced in one instance for nearly a hundred miles, running parallel to the course of the Wabash river, in the State of Indiana.

Again, it will be found to occupy an isolated spot, comprised in

an area of one hundred acres, whilst for a considerable distance around it is not produced. Thus having the locality perfectly circumscribed, much labor has been expended in order to discover some production peculiar to the locality. The search has been uniformly unsuccessful in the attainment of its object. The general appearance of these infected districts is somewhat peculiar. I have always observed that the situation of the ground is elevated above that of the surrounding country, occupying what is denominated a ridge, and that the quality of the soil is in general of an inferior description. The growth of timber is not observed to be so luxuriant as in situations otherwise similar, but is scrubby, and stunted in its perfect development. Throughout the entire district in which these localities are interspersed, there is observed an absence of the occurrence of stones scattered over the surface, whilst in the infected districts, they are almost universally present. They are of small size and darkened aspect externally, breaking with a regular and shining fracture, and, upon analysis, imperfectly made, were found to contain a considerable portion of iron, with slight traces of copper. Another more decided and peculiar appearance, which serves to distinguish them from other spots, is the breaking forth of numerous feeble springs, furnishing a trifling supply of water, but not varying in quantity with the change of seasons. In its appearance, it presents the general evidences of a sulphurous and ferruginous contamination.

Experiments made upon the water collected from these springs, or more properly called oozes from the soil, with the greatest care, by the employment of the most delicate chemical re-agents, failed to indicate the presence of any mineral except iron, sulphur, traces of magnesia, and a quantity of copper barely capable of being demonstrated. A belief being entertained by many that the disease is occasioned by arsenic, or some of its salts, I, with much care and patience, subjected not only the water, but likewise the earth, from these districts to a most rigid examination, and by no test was I furnished with the slightest evidence of its presence.

An intelligent medical friend expressed to me his belief, that it was produced by the inhalation of some noxious gases generated during the night; in proof, he stated that he had observed cattle, which were regularly housed each evening, escaped its attacks, and that when suffered to remain at large, they were frequently seized with the disease. It is difficult to form this belief of the nature of the cause, as we can hardly conceive the particular action of any combination of circumstances, capable of giving rise to such an emanation only at night, ceasing to operate during the day. The most popular belief is in favor of a vegetable origin. But this appears irreconcilable with the fact that the disease has frequently appeared with its greatest virulence when the ground has been for weeks previously covered with snow.

For my own part, I would most willingly subscribe to the opinion that some mineral or mineral combination possesses the agency of its production. Yet I confess that I cannot even imagine what must be the nature of that substance producing such violent and anomalous effects, and in its operations so unlike anything with which we are acquainted. The cause, whatever it may be, when it enters into the organization of the animal, either by inducing a specific action in the tissues of the economy, or by a combination with some of the elements of the body, forms a poison not more violent in its operation than singular in the effects it can produce. If this cause should prove to be a mineral, it must be one of great subtlety, from its difficulty of detection, and from its virulence it must possess qualities and activity not equalled nor resembled by any metal or metallic combination yet discovered. No substance of which we have any knowledge will produce like phenomena.

Hoping that if I could succeed in developing the same symptoms and effects by some active or poisonous article, it might, by the probable analogy of the agents, lead to the discovery of the nature of this poison, I patiently tried many. The action of none of the mineral poisons were found at all similar. My experiments were chiefly made on dogs, and in them I found the symptoms immediately preceding their death, occasioned by a fatal dose of strychnia, greatly to resemble those produced by the continued administration of the flesh of an animal which had perished from milk sickness. The appearances on dissection differ in a greater degree, and particularly in cases of poisoning by the vegetable proximate principle, exhibit the blood in a state more nearly resembling a healthy condition. With the view of an extensive series of experiments, I procured the body of a full grown cow, which had perished suddenly from the affection, with violent symptoms. The brain was immersed in a copious effusion of blood, and in no part of the body was it found coagulated. The flesh in external appearances did not differ from that of healthy beef, unless that it was slightly darker, and a thin bloody fluid continually dropped from it. By exposing it by the side of a healthy portion, I found that the influence of the sun rendered the specimen from the diseased animal offensive, and turned it to a greenish hue, whilst the other remained comparatively sound and unaffected. It can possess nothing peculiar in its taste, for persons who have partaken of it have not remarked anything unusual, and animals will exercise no preference, if the two descriptions be simultaneously presented to them. The beef which I procured was subjected to the ordinary process of salting, which did not in the least affect its poisonous properties.

Butter and cheese, manufactured from the milk drawn from an infected cow, are supposed to be the most concentrated forms of this poison. They possess no distinguishing appearance, odor, or taste,

from the healthy article. A very minute quantity of either will suffice to develope the disease in man. The cream, ordinarily sufficient to be added to the coffee drank at a single meal, is said to have induced an attack. The butter or cheese eaten at one repast has frequently been known to prove effective. The property is not contained in any of the elements of the milk exclusively, but distributed throughout the whole of them, being possessed by the butter-milk as well as the whey. Beef, in the quantity of a few ounces, will produce the disease, and it is believed in a more violent and fatal form than when it is produced by milk or any of its preparations.

The effect of the poison is manifested throughout the entire system, and vitiates all the secretions. An experiment, which went far to prove how deeply the milk of other animals is imbued with its poison, was made by administering the infected meat to a bitch suckling five puppies. The effect produced in them was very sudden, and the entire litter died in four days, which was two days before the occurrence of the death of the mother.

The subtle, poisonous principle, of whatever it may be proved to consist, seems to possess the power of infinite reproduction, by some vital or chemico-vital action of the system of those animals poisoned by its influence. Thus, supposing one pound of flesh to prove sufficient to produce the death of another animal, it will be found that each pound of flesh of that animal so destroyed, will possess as active powers of destruction, and will, in its turn, serve to contaminate the whole body of another animal in the same degree.

Dr. J. B. Johnston, of Indiana, says: "I never knew the disease to prevail where there was not a free growth of weeds. I well know that it is circumscribed, that a small section will produce the disease, then an exemption for some distance, when it will again recur. So of some farms; a portion will produce it, and the other will not. In fact, there is not a county from Floyd to the mouth of the Wabash, and as far north as White River, that is exempt from milk sickness; and it often occurs in both Southern Illinois and Kentucky. I have never heard of it above the 41st degree of north latitude, and it seldom reaches that line. My firm convictions are, that the disease termed milk sickness is produced by the *rhus toxicodendron*, or *poison oak*, and that it is a separate and distinct species from the radicans, or *poison vine*. It is further stated that the poison *oak* never *vines*—that it is never seen to take hold on trees, and that it grows from one to three feet in height; that it has *three*, while the radicans or poison vine has five leaves."

Dr. McIlhenny, of Ohio, who has paid much attention to this disease, says: "On the cause of milk sickness, we must be allowed to express our decided conviction, that it is produced by the rhus toxicodendron, or poison oak, for the following reasons:—

1. Milk sickness does not prevail where there is no rhus—that in

every section of country where none of the small rhus can be found, there can be none of the trembles found.

2. It does universally exist where there is an abundance of the smaller rhus.

3. It never occurs until vegetation comes forth in the spring.

4. Where it prevails most, the rhus is in its greatest luxuriance.

5. After the heavy frosts kill all vegetation, the disease subsides.

6. It is a well known fact, that cultivation kills the poison oak—entirely destroys it.

7. It is equally as well established, that animals kept within a well cultivated enclosure are perfectly exempt from the disease.

8. Almost every observant and intelligent individual who has been raised amidst the disease, has come to the conclusion, that the rhus toxicodendron is the cause of milk sickness.

9. That it is distinguished from the radicans, or common poison vine, by its different number of leaves—also, by its acridness of character.

10. A certain locality produces the disease, find it where you may, such as flat, heavy timber-land, interspersed with hazle and other underbrush, which is quite productive of the rhus.

11. The seldom appearance of the disease on hilly, dry ground, is in consequence of such a place not being congenial to the production of that plant, so that what little does exist, is not so apt to produce the disease, in consequence of its unhealthy growth."

"As to the pathology of this disease I know but little. I have treated quite a number of cases, but have never been favored with a *post mortem* examination; consequently, I have had no other means of ascertaining morbid appearances than that of judging from symptoms: the mere external developments of the internal condition. We are told, however, that in animals which die of this disease, the *manifolds*, or mesentery, is in a hard, dry condition, and, in many cases, perfectly black; and that all the folds which lie enclosed in the bowels, and are in close contact with them, are frequently in such a brittle condition, that they can be readily broken, particularly those that envelope the stomach; and that traces of inflammatory action can be frequently discovered the whole length of the intestinal canal; but the greater amount, those that have left the deepest marks, are to be seen in and around the stomach and duodenum.

"If this should be a true condition of the morbid appearances of the animal, which we are satisfied it is, we may reasonably expect that the same results are to be seen in the human subject. So far, however, as my opinion goes, I believe that the poison, when taken into the stomach, produces inflammation of that organ, particularly confined to the mucous coat; that inflammation continuing, thickens the mucous lining to such an extent that it closes, in proportion to its severity, the passage from the stomach to the bowels. I am

satisfied that there is inflammation down to the upper part of the bowels, but, generally, in a slight degree. I do not believe that there is any general inflammatory condition of any of the chylopœtic viscera, but that the entire force of the disease is spent upon the stomach, and, perhaps, duodenum.

"From what observation I have been able to make upon the subject, I am inclined to the opinion that the lower portions of the bowels remain, measurably, if not entirely, exempt from inflammation; that it is entirely a disease of the stomach; that in proportion to the severity with which that organ is attacked, in that proportion will the chylopœtic viscera become deranged.

"Another proof that the disease is inflammatory, is the constipated condition of the bowels. There could not be such a dry and hardened condition of the fecal matter produced by any other derangement, excepting that of inflammatory action.

"I have been led to make these remarks, in consequence of an opinion that is prevalent with some of our practitioners, that the disease is nervous; that the great gastric irritability is, or might be, attributed to nervous excitement. This, to me, appears impossible; for, if the nerves of the stomach were in such a morbid condition, acting under such a powerful excitement as to produce such distressing symptoms, would not the brain become sympathetically affected? Would we not have an apparent case of phrenitis? Whereas, the mind, *generally*, remains quiet. We sometimes see mental depression, but rarely ever mental aberration."

Professor Drake, of Kentucky, says: "In the earliest stages of this malady, in the cow, it may not display its existence, if the attack be not violent and the animal left to itself; for in the beginning, as in all stages of the disorder, the appetite seems to be unimpaired, and the thirst not increased. Even this early stage, not less than the more advanced, appears, however, to be attended with constipation of the bowels. The animal at length begins to mope and droop, to walk slower than its fellows, and to falter in its gait. If, under these circumstances, it should be driven, and attempt to run, the debility and stiffness of its muscles are immediately apparent. It fails rapidly, trembles, pants, and sometimes seems blind, as it runs against obstacles, but this may arise from vertigo; at length it falls down, lies on its side quivering, and is not, perhaps, able to rise for several hours, sometimes never. Now and then, the quivering amounts to a slight convulsion. When the disease is not violent, the animal, after a longer or shorter period, is again on its feet; but its capacity for muscular effort is greatly impaired, and, if hurried in the slightest degree, it is seized with trembling and stiffness, and may even fall again. Of the state of the circulation, when it lies seriously ill, but little is known, as the pulse has not been inspected. One observer perceived that the nose of a heifer was hot, but others

have found that part of the skin generally cool. Perhaps their observations were made in different stages of the disease. While lying unable to walk, the animal will still eat freely, and also take drink, but does not seem to have excessive thirst. Its costiveness continues to the last when the malady goes on to a fatal termination. Of the symptoms which precede dissolution we could not obtain a satisfactory account. Our witnesses generally declared, however, that the abdomen does not swell in any stage of the disease. When it assumes a chronic form, the animal is liable, for weeks and even months, to muscular infirmity under exercise, looks gaunt and thin, its hair assumes a dead appearance, and sometimes falls off in considerable quantities, especially from the neck."

"We met with no medical gentleman who had subjected animals laboring under this disease to a systematic, or even varied empirical treatment. All the people of the district have one and the same indication to fulfill, that of opening the bowels. When this can be effected, the animal, they say, scarcely ever dies—when it cannot, death occurs. For the fulfillment of this indication, Epsom salts has been administered in very large quantities, even to pounds, but without effect. Drenches of lard and various mixtures have also been given, with no satisfactory result. Judge Harold, near South Charleston, has exhibited calomel followed by lard—no essential benefit. Dr. Toland has administered the oil of turpentine, in doses of eight, twelve, and sixteen ounces, without advantage. An opinion is prevalent, that drenching animals injures them by causing them to struggle. On the whole, we found among the people of the district a total want of confidence in all kinds of cathartic *medicines;* and an exclusive reliance on *Indian corn.* Some preferred old corn, some new, and others that which had been frost-bitten. This is fed to all these species of animals that are accustomed to eat it, and is said never to be refused. The more the animal will eat, the greater is the hope of the owner. It is said to produce *purging,* when every other means have failed, and then, it is affirmed, recovery is almost certain. On these points we found but one opinion in the district. Several of its physicians, after trying other things, had, with the people, settled down on this."

"We found *blood-letting* not in favor. Dr. Toland supposes it has, generally, been employed at too late a period. Many non-professional persons spoke of having resorted to it without advantage, and some thought it had done harm."

[A friend assures the editor that *early* bleeding, purgation, and injections, have proved effectual to remove the disease in most cases.]

COW-POX.

Cows are subject to two distinct species of pustular eruption on the teats. Little vesicles or bladders appear; they often differ con-

siderably in size and form, and are filled with a purulent matter. In the course of a few days a scab forms upon them, which peels off, and the part underneath is sound. If the pustules are rubbed off in the act of milking, or in any other way, small ulcers are left, which are very sore, and sometimes difficult to heal.

The best treatment is washing and fomenting; a dose of physic, and the application of the ointment for sore teats recommended in page 408. The cause, like that of many other pustular eruptions, is unknown; except that it is contagious, and is readily communicated from the cow to the milker, if the hand be not quite sound, and from the milker to other cows.

There is another kind of pustular eruption, of a more important character, and with which the preceding one has been confounded. It also consists of vesicles or bladders on the teats; but they are larger, round, with a little central depression; they are filled at first with a limpid fluid, which by degrees becomes opaque and purulent, and each of them is surrounded by a broad circle of inflammation. This is more decidedly a constitutional disease than the former. The cow exhibits evident symptoms of fever; she does not feed well; sometimes she ceases to ruminate, and the secretion of milk is usually diminished.

These pustules go through a similar process with the former ones—they dry up, and at length the scabs fall off, leaving the skin beneath sound; but if they are broken before this, the ulcers are larger, deeper, of a more unhealthy character, and generally far more difficult to heal. This is the genuine cow-pox.

The treatment is nearly the same, except that, being accompanied by more constitutional disturbance, an aperient is more necessary, and it may occasionally be prudent to abstract blood. The frequent application of Goulard's lotion, with an equal portion of spirit of wine, will, at least in the early stage of the ulcer, be preferable to the ointment; but better than this, and until the ulcers are beginning to heal, will be the dilute solution of the chloride of lime. If the teats are washed with this before the cow is milked, it will go far toward preventing the communication of the disease.

The most interesting circumstance connected with this pustular eruption is, that the persons on whom it appeared were, for a considerable period, (it was once thought, during life,) protected from the small-pox. This was known among farmers from time immemorial. But to no one, whom experience had convinced of the active protective power of the cow-pox, had it occurred to endeavor to ascertain whether it might not be possible to propagate the affection by innoculation from one human being to another, and thus communicate security against small-pox at will.

To the mind of Mr. Jenner, the probability of accomplishing this first presented itself. He innoculated a boy with the matter taken

from the hands of a milkmaid who had been infected The disease was communicated, and with it the immunity which he expected. He multiplied his experiments, and was successful in all of them; and, at length, established the power of vaccination, and proved himself to be one of the greatest benefactors to the human race that ever lived. Some practitioners of no little eminence have recommended (and perhaps it deserves more consideration than has been given to it) a return to the primary fountain for a recruit of power and energy, after the lapse of a certain period and the prosecution of a certain number of successive experiments.

CHAPTER XVII.

THE GENERAL DISEASES AND MANAGEMENT OF CALVES.

In whatever manner the calf is afterwards to be reared, it should remain with the mother for a few days after it is dropped, and until the milk can be used in the dairy. The little animal will thus derive the benefit of the first milk, that to which nature has given an aperient property, in order that the black and glutinous fæces that had been accumulating in the intestines during the latter months of the fœtal state, might be carried off. The farmer acts wrongly when he throws away, as he is too much in the habit of doing, *the beastings*, or first milk of the cow.

NAVEL-ILL.

The calf being cleaned, and having begun to suck, the navel-string should be examined. Perhaps it may continue slowly to bleed. In this case a ligature should be passed round it closer, but, if it can be avoided, not quite close to the belly. Possibly the spot at which the division of the cord took place may be more than usually sore. A pledget of tow well wetted with Friar's balsam should be placed over it, confined with a bandage, and changed every morning and night, but the caustic applications, that are so frequently resorted to, should be avoided.

Sometimes, when there has been previous bleeding, and especially if the caustic has been used to arrest the hæmorrhage, and at other times, when all things have seemed to have been going on well, inflammation suddenly appears about the navel, between the third and eighth or tenth day. There is a little swelling of the part, but with more redness and tenderness than such a degree of enlargement would indicate. Although there may be nothing in the first appearance of this to excite alarm, the navel-ill is a far more serious business than some imagine. Fomentation of the part in order to disperse the tumor, the opening of it with a lancet if it evidently *points*, and the administration of two or three two-ounce doses of castor oil, made into an emulsion by means of an egg, will constitute the first treatment; but if, when the inflammation abates, extreme weakness should come on, as is too often the case, gentian and laudanum, with, perhaps, a small quantity of port wine, should be administered.

Homœopathic treatment.—In inflammation give some doses of *acon-*

itum ; and then *arnica,* and wash the parts with *arnica* water; and if there be weakness, give *china* to combat it.

CONSTIPATION.

If the first milk, or *beastings,* has been taken from the calf, and constipation, from that, or from any other cause, succeeds, an aperient should be administered without delay. The sticky black fæces, with which the bowels of the newly-born calf are often loaded, must be got rid of. Castor oil is the safest and the most effectual aperient for so young an animal. It should be given, mixed up with the yolk of an egg, or in thick gruel, in doses of two or three ounces ; and even at this early age, the carminative which forms so usual and indispensable an ingredient in the physic of cattle must not be omitted : a scruple of ginger should be added to the oil.

Constipation of another kind may be prevented, but rarely cured. If the weather will permit, and the cow is turned out during the day, and the calf with her, the young one may suck as often and as much as it pleases—the exercise which it takes with its mother, and the small quantity of green meat which it soon begins to crop, will keep it healthy ; but if it be under shelter with its dam, and lies quiet and sleepy the greater part of the day, some restraint must be put upon it. It must be tied in a corner of the hovel, and not permitted to suck more than three times during the day, otherwise it will take more milk than its weak digestive powers will be able to dispose of, and which will coagulate, and form a hardened mass, and fill the stomach and destroy the animal. The quantity of this hardened curd which has sometimes been taken from the fourth stomach almost exceeds belief. This is particularly the case when a foster-mother, that probably had calved several weeks before, is given to the little one, or the calf has too early been fed with the common milk of the dairy. The only chance of success in this disease lies in the frequent administration (by means of the stomach-pump, or the drink poured gently down from a small horn) of plenty of warm water, two ounces of Epsom salt being dissolved in the quantity used at each administration.

At a later period, the calf is sometimes suffered to feed too plentifully on hay, before the manyplus has acquired sufficient power to grind down the fibrous portions of it. This will be indicated by dullness, fever, enlargement of the belly, and the cessation of rumination, but no expression of extreme pain. The course pursued must be the same. The manyplus must be emptied, either by washing it out, by the frequent passage of warm water through it, or by stimulating it to greater action, through the means of the sympathetic influence of a purgative on the fourth stomach and the intestinal canal.

A tendency to costiveness in a calf should be obviated as speedily as possible—it is inconsistent with the natural and profitable thriving

of the animal, and it can never long exist without inducing a degree of fever, always dangerous, and generally fatal.

Homœopathic treatment.—The more or less inflammatory state which generally accompanies it, requires that we commence the treatment with a dose of *aconitum*. The most effectual means then is *nux vomica*; it is indicated chiefly, when the evacuations from the bowels are scanty, hard, covered with mucus, and when the animal frequently draws up the belly. If there be no thirst, we should have recourse to *china* and *bryonia*. The latter remedy is also suitable when the constipation has been produced by cold, a circumstance in which it frequently alternates with diarrhœa. *Opium* and *argila* must be employed when the inactive state of the intestinal tube allows nothing to escape from the body, and the animal remains lying down, though evincing no pain. In very obstinate constipation, where the rectum is empty, and also where only a small quantity of matter escapes, which is not very hard, *plumbum* never fails to be effectual.

DIARRHŒA.

The disease, however, to which calves are most liable, and which is most fatal to them, is purging. It arises from various causes: the milk of the mother may not agree with the young one; it may be of too poor a nature, and then it produces that disposition to acidity, which is so easily excited in the fourth stomach and the intestines of the calf; or, on the other hand, it may be too old and rich, and the stomach, weakened by the attempt to convert it into healthy chyle, secretes or permits the development of an acid fluid. It is the result of starvation and of excess—it is the almost necessary consequence of a sudden change of diet; in fact, it is occasionally produced by every thing that deranges the process of healthy digestion.

The farmer needs not to be alarmed although the fæces should become thin, and continue so during two or three days, if the animal is as lively as usual, and feeds as he was wont; but if he begins to droop, if he refuses his food, if rumination ceases, and he is in evident pain, and mucus, and perhaps blood, begin to mingle with the dung, and that is far more fetid than in its natural state, not an hour should be lost. The proper treatment has already been described under the titles of diarrhœa and dysentery, pp. 338, 339. A mild purgative (two ounces of castor oil, or three of Epsom salt) should first be administered, to carry away the cause of the disturbed state of the bowels. To this should follow anodyne and astringent and alkaline medicines, with a mild carminative. The whole will consist of opium, catechu, chalk, and ginger. The proportions of each have already been given in p. 339, when describing the treatment of diarrhœa. The use of this mixture should be accompanied by frequent drenching with starch or thick gruel; by the removal of green or acescent food, and by giving bran mashes, with a little pea or bean flour.

Homœopathic treatment.—The cure of diarrhœa is effected by different means. In the diarrhœa which bursts out suddenly, or the acute form, we should commence with a couple of doses of *aconitum* at short intervals; after which, in most cases, *arsenicum* and *ipecacuanha* are very effectual. The diarrhœa brought on by cold often yields to *aconitum* alone, as that resulting from any irregularity in diet yields to *arsenic*. If in the latter case there be also loss of appetite, and if *arsenic* does not effect a cure, *pulsatilla* should be given, or when there is an absolute repugnance to food, *antimonium crudum*, especially when the diarrhœa alternates periodically with constipation. If there be frequent dejections without pain, we have recourse to *rheum*. *Asarum* is useful, if the evacuations are fluid, and sometimes mixed with bloody mucus.

In the treatment of chronic diarrhœa, besides *china*, *sulphur*, *chamomilla*, and *veratrum*, which has been found useful more than once, we should employ *acidum phosphoricum*, *bryonia*, *calcarea acetica*, *dulcamara*, *magnesia carbonica*, *petroleum*, and *phosphorus*. Diarrhœa is usually accompanied with a general morbid state, with respect to which we are to choose, among these several means, that which suits best. *Sulphur* and *arsenicum* are the principal remedies for diarrhœa in calves.

When slight, dysentery resembles severe diarrhœa, and requires the remedies which have been indicated under the head of the latter disease.

In calves, diarrhœa, accompanied with emaciation and loss of appetite, very often puts on the dysenteric character; the animal every moment passes liquid matter of a greenish or yellowish color. In such case, *pulsatilla* is a specific. Benefit has also been obtained from *chamomilla*, and, when the evacuations were white, from *mercurius vivus*.

HOOSE.

A sufficiently alarming view has been given of this disease in adult cattle, but calves are even more subject to it; it takes on in them a more dangerous character, and more speedily terminates in wasting and in death. Hoose often assumes an epidemic form in cattle of a twelvemonth old and upward; it often appears as an epidemic among calves, and carries off great numbers of them. The treatment recommended for grown cattle under the article Hoose, in p. 248, &c., should, with such deviation as the different age and situation of the beast require, be adopted here. The bleeding, perhaps, should not be carried to so great an extent, and even somewhat more attention should be paid to the comfort of the animal.

Homœopathic treatment.—That which is at first dull and hollow, excited by the least effort, and more particularly violent after the animal has drunk, generally indicates a more or less serious affection

of the lung. The means to be adopted when no other symptoms of disease are observed, are: *dulcamara*, in cough by cold; *bryonia* (in repeated doses,) in inveterate cough; *Belladonna* and *drosera*, in chronic cough; *hyoscyamus* when the attacks are very frequent; *squilla*, in cough which comes on after fatigue, and which interferes with the respiration; *Chamomilla*, in dry cough, with diarrhœa; *pulsatilla*, in frequent attacks of dry cough, with loss of appetite; *spiritus sulphuratis* in very obstinate cough. When the cough is the symptom of another disease, it yields to the treatment required by the latter.

CASTRATION.

The period pretty generally selected is between the first and third months. The nearer it is to the expiration of the first month, the less danger attends the operation.

Some persons prepare the animals by the administration of a dose of physic; but others proceed at once to the operation when it best suits their convenience, or that of the farmer. Care, however, should be taken that the young animal is in perfect health. The mode formerly practised was simple enough:—a piece of whipcord was tied as tightly as possible round the scrotum. The supply of blood being thus completely cut off, the bag and its contents soon became livid and dead, and were suffered to hang, by some careless operators, until they dropped off, or were cut off on the second or third day.

It is now, however, the general practice to grasp the scrotum in the hand, between the testicles and the belly, and to make an incision on one side of it, near the bottom, of sufficient depth to penetrate through the inner covering of the testicle, and long enough to admit of its escape. The testicle immediately bursts from its bag, and is seen hanging by its cord.

The careless or brutal operator now firmly ties a piece of small string round the cord, and having thus stopped the circulation, cuts through the cord half an inch below the ligature, and removes the testicle. He, however, who has any feeling for the poor animal on which he is operating, considers that the only use of the ligature is to compress the blood-vessels and prevent after-hemorrhage, and therefore saves a great deal of unnecessary torture, by including them alone in the ligature, and afterwards dividing the rest of the cord. The other testicle is proceeded with in the same way, and the operation is complete. The length of the cord should be so contrived that it shall immediately retract into the scrotum, but not higher, while the ends of the string hang out through the wounds. In the course of about a week the strings will usually drop off, and the wounds will speedily heal. It will be rarely that any application to the scrotum will be necessary, except fomentation of it, if much swelling should ensue.

A few, but their practice cannot be justified, seize the testicle as soon as it escapes from the bag, and, pulling violently, break the cord and tear it out. It is certain that when a blood-vessel is thus ruptured, it forcibly contracts, and very little bleeding follows; but if the cord breaks high up and retracts into the belly, considerable inflammation has occasionally ensued, and the beast has been lost.

The application of *torsion*, or the twisting of the arteries by means of a pair of forceps which will firmly grasp them, promises to supersede every other mode of castration, both in the larger and the smaller domesticated animals. The spermatic artery is exposed, and seized with the forceps, which are then closed by a very simple mechanical contrivance; the vessel is drawn a little out from its surrounding tissue, the forceps are turned round seven or eight times, and the vessel liberated. It will be found perfectly closed; a small knot will have formed on its extremity; it will retract into the surrounding substance, and not a drop more of blood will flow from it: the cord may then be divided, and the bleeding from any little vessel arrested in the same way. Neither the application of the hot iron nor of the wooden clamps, whether with or without caustic, can be necessary in the castration of the calf.

Homœopathic treatment.—After the operation, give some doses of *arnica*, and wash the parts with *arnica* water.

CHAPTER XVIII.

DISEASES OF THE MUSCULAR SYSTEM AND OF THE EXTREMITIES.

RHEUMATISM.

It is inflammation of the fascia, or cellular coat of the muscles, and also of the ligaments and synovial membranes of the joints. If a cow has been exposed to unusual cold and wet, particularly after calving, or too soon after recovery from serious illness, she will often be perceived to droop. She becomes listless, unwilling to move, and by degrees gets off her feed. If urged to move, there is a marked stiffness in her action, at first referable chiefly, or almost entirely, to the spine; and she walks as if all the articulations of the back and loins had lost their power of motion. She shrinks when pressed on the loins; and the stiffness gradually spreads to the fore or hind limbs. The farmer calls it *chine fellon;* if it gets a little worse, it acquires the name of *joint fellon*, and worse, unless care is taken, it speedily will become. Some of the joints swell; they are hot and tender; the animal can scarcely bend them; and she cannot move without difficulty and evident pain.

We find rheumatism in cattle chiefly prevalent in a cold, marshy country—in places exposed to the coldest winds—in spring and in autumn, when there is the greatest vicissitude of heat and cold—in animals that have been debilitated by insufficient diet, and that cannot withstand the influence of sudden changes of temperature—in old cattle particularly, and such as have been worked hard, and then turned out into the cold air, with the perspiration still hanging about them.

It seems to assume the acute and the chronic form. One animal will labor under considerable fever; he will scarcely be able to move at all, or when he does, it extorts from him an expression of suffering. Another seems to be gay and well, when the air is warm and dry; but as soon as the wind shifts, or immediately before it changes, he is uneasy and comparatively helpless. On some portions of a farm, nothing seems to ail the cattle; on others, lower, moister, or more exposed, the cattle crawl about stiffly and in pain. In some

extreme cases, the quantity of milk rapidly diminishes, and the cow wastes away, and becomes a mere skeleton.

Rheumatism in cattle may be palliated, but rarely removed. The treatment of it consists in making the animal comfortable—in sheltering her from the causes of the complaint—in giving her a warm aperient, which, while it acts upon the bowels, may determine to the skin, as sulphur, with the full quantity of ginger. The practitioner will afterwards give that which will yet more determine to the skin, as antimonial powder, combined with an anodyne medicine, almost any preparation of opium;—and he will have recourse to an embrocation stimulating to the skin, and thus probably relieving the deeper seated pain, as camphoretted oil, or spirit of turpentine and laudanum.

Homœopathic treatment.—The most effectual remedy is *aconitum*, followed by *arsenicum*. *Bryonia* is good when the feet are paralyzed. *Arsenicum* is indicated when the animal is observed to walk with the greatest precaution, when he trembles after drinking cold water, and the disease has been brought on by cold drinks, or an excess of food. *Rhus toxicodendron* should be prescribed when the disease results from too much fatigue. *Chamomilla* restores the milk secretion, after the other ailments have been removed.

SWELLINGS OF THE JOINTS.

These are usually the consequence of rheumatism. Small tumors appear in the neighborhood of the joints that were most affected. They seem at first to belong to the muscles; but they increase: they involve the tendons of the muscles, and then the ligaments of the joints, and the lining membrane of the joints. When this is the case, other diseases are at hand—inflammation of the lungs or bowels; but, oftenest of all, rheumatism degenerates into palsy.

The superficial veins in the neighborhood of the joints sometimes become full and large; they grow decidedly varicose. When the causes of rheumatism are removed, the situation of the animal changed, and the weather has become more congenial, the lameness decreases, the swellings diminish, but the varicose veins remain.

The enlargements of the joints connected with or the consequences of rheumatism are removed—but in the majority of cases only temporarily—by stimulating embrocations, of which spirit of turpentine or the compound one of turpentine, ammonia, camphoretted spirit, and laudanum, is the most effectual. Some, however, will not disappear without the application of the cautery.

There are other tumors about the joints, and particularly the knees of cattle, which are not necessarily connected with rheumatism, and in many cases quite independent of it, although they are found only in beasts that are out at pasture. They are of two kinds. The first occupies the fore-part of the knee, and generally one knee at a time.

A fluid collects in the tissue immediately beneath the skin, and which yields to the pressure of the finger. The pressure causes no pain, nor is there any inflammation of the skin, but there is some degree of lameness. The tumors insensibly increase; they still contain a fluid. Inflammation is now sufficiently evident: the lameness is very great; and the motion of the joint is almost destroyed.

Frictions with turpentine and hartshorn are often employed: sometimes one composed of tincture of cantharides is used. These occasionally disperse the tumors for a while, but they speedily reappear. The hot iron is a more effectual remedy. If the tumor be pierced with it, a glairy fluid escapes, and the swelling subsides. A blister should then be applied, and the animal kept in the cow-house. The tumor does not often return, but it is a considerable time before the lameness quite disappears.

A more frequent species of tumor is of a hard character. It does not yield at all to pressure; it evidently causes considerable pain, and the animal is very lame. These tumors are almost invariably confined to one knee. Here, neither frictions nor perforation with the hot iron will be of material benefit, although deep firing has sometimes succeeded.

Other tumors, sometimes immediately on the joints, and at other times at a greater or less distance from them, and of variable degrees of hardness; sometimes adhering to and identified with the substance beneath, and at other times more or less pendulous, do not appear to give much pain to the animal, nor do they often interfere with the motion of the joints, but they are a great eyesore, and, in a few instances, they suddenly take on a disposition to increase with great rapidity. These have been blistered without effect—setons have been passed through them with variable result, and occasionally recourse has been had to excision.

The ointment of the hydriodate of potash should be well rubbed into the tumors and the neighboring parts; and the hydriodate at the same time be administered internally. The success of this treatment with the two last species of tumors has been almost as great as the practitioner could desire. They have uniformly very much diminished in size, and in the great majority of cases they have disappeared. The ointment should be composed as already recommended, and six grains of the hydriodate given morning and night in a mash. On the first species of tumor unconnected with rheumatism, the iodine has seldom had decided effect.

Homœopathic treatment.—Tumors vary much with respect to their constitution and the region of the body where they make their appearance. Those arising from an external cause, are, for the most part, hot, at least at the commencement; these are to be treated with *arnica* (internally and externally), which is to be followed by *arsenicum*, or, when there is pain, by *conium*. Those which depend

on internal causes, require *bryonia*, chiefly in cases of cold, or *china* and *arsenicum* alternately, or *sulphur*, or *mercurius vivus*.

Aurum and *belladonna* are the principal remedies for tumors on the head; *baryta carbonica* for those on the lower jaw. With respect to tumors on the chest, *aconitum* and *bryonia* are suitable, if they are owing to cold; *arnica*, if they are the consequence of compression. When they are covered with scabs, *thuja* should be given, and, after some days, *sulphur*.

ULCERS ABOUT THE JOINTS.

These tumors sometimes assume very much the appearance of farcy in the horse. They run in lines, they follow the apparent course of the veins, but they belong to the absorbents. They frequently ulcerate—the wounds are painful, deep, and spreading.

The dilute solution of the chloride of lime will form the best application, and will usually be successful; especially if occasionally aided by some caustic wash, as a solution of blue-vitriol, or dilute nitric acid.

Homœopathic treatment.—In ulcers which suppurate, the principal means are: *arsenicum*, internally and externally, if the edges are painful, everted, inflamed, with unhealthy pus; *silicea*, if the pus is thick and of a bad color; *chamomilla*, *sepia*, and *antimonium*, when proud flesh becomes developed on it. *Pulsatilla* possesses specific virtues in the case of fistulous ulcers. The following substances as intercurrent remedies: *ledum palustre*, when the fistulæ have an opening sufficiently large, and the bottom is white and lardaceous; *calcarea carbonica*, a capital remedy in all forms of fistulæ; *lycopodium*, when the orifice is small and there are numerous burrows; these remedies are interposed when the repeated doses of *pulsatilla* no longer bring about improvement, and about four days after we should recur to the latter. Occasionally it is necessary to employ, in addition, several intercurrent remedies.

OPENED JOINTS.

These sometimes occur from the injudicious lancing of the first kind of tumor, but oftener from accident. The principle of the treatment of open joints is to close the orifice as soon as possible, and before the secretion of the joint oil is stopped, and the cartilages of the opposing bones rub on each other, and the delicate membrane which lines these cartilages becomes inflamed, and the animal suffers extreme torture, and a degree of fever ensues by which he is speedily destroyed. The wound is best closed by means of the firing iron.

Homœopathic treatment.—Wounds of small extent are cured in a very little time by the use of *arnica* externally. In such as are deeper, *arnica* must be administered internally also. *Symphytum* is useful whenever there has been any lesion of the bones or peri-

osteum. *Conium* should be employed in the case of wounds resulting from compression or contusion; and in the case of those which are accompanied with luxation, *rhus toxicodendron* alternately with *arnica*. When a wound has occasioned great loss of blood, *china* is useful to combat the debility caused by the hæmorrhage. The fever, which is generally associated with wounds of a certain extent, yields to *arnica* and *aconitum*, employed alternately. Extensive wounds are never cured without suppuration; this is generally set up five or six days after the injury; and as long as it wears a healthy character, art should not interfere; but if the pus be turbid and have a bad smell, *asafœtida* and *mercurius vivus* should be employed; if it be thick and have a bad color, *silicea;* if proud-flesh make its appearance, *chamomilla*, *sepia*, and *arsenicum*.

SPRAINS.

Working oxen, and those that have been driven long journeys, are liable to *sprain*, and particularly of the fetlock joint. The division of the lower part of the cannon or shank-bone, in order that it may articulate with the two pasterns into which the leg is divided, renders this joint particularly weak and susceptible of injury. The treatment consists of fomentation of the part, to which should succeed bandages very gradually increasing in tightness, cold lotions, and afterwards, if the deep-seated inflammation cannot otherwise be subdued, stimulating applications, blistering, or, as the last resource, firing. The inflammation attending sprain of this joint is often very great, and enormous bony enlargement and anchylosis are not unfrequently seen. They embrace the fetlock-joint; they frequently include the pastern: but oftener, the inflammation and bony enlargement extend up the leg, and particularly the posterior part of it, almost to knee; for the division of the flexor tendons, in order to reach both toes, takes place considerably above the fetlock (the precise place varying in different animals), and these, from the oblique direction which they take, are peculiarly liable to strain, with probability of serious injury. The firing iron must be severely applied before the mischief has proceeded to this extent.

Homœopathic treatment.—A sprain, when the result of a false step, brings on lameness more or less perceptible, and, when it is severe, a hot tumefaction in the neighborhood of the joint. The accident, when of recent date, promptly yields to *arnica*, employed both internally and externally. Otherwise, or if there be much pain from the commencement, as also much swelling and lameness, *rhus toxicodendron*, and especially *ruta*, should be administered, which latter remedy in such cases possesses specific virtues.

DISEASES OF THE FEET.

These are numerous and serious. The leg of the ox is divided at

the fetlock. There are two sets of pasterns, two coffin-bones, and two hoofs to each leg. The shank-bone is double in the fœtus, but the cartilaginous substance between the two larger metacarpals is afterwards absorbed, and they become one bone; the lower bones, however, continue separate. Each division has its own ligaments and tendons, and is covered by its own integument. This gives rise to various inflammations and lamenesses, which have been confounded under the very objectionable term of

FOUL IN THE FOOT.

Hard and irritating substances often insinuate themselves between the claws, and, becoming fixed there, and wounding the claws on one or both sides, become a source of great annoyance, pain, and inflammation, and the beast suddenly becomes lame, and the pasterns are much swelled. They should be carefully examined, the interposed substance should be removed, the wound washed thoroughly clean, and a pledget of tow, dipped in Friar's balsam, or covered with healing ointment, introduced between the claws, and there confined by means of a roller. Lameness from this cause will, in general, be readily removed.

The foot being thus divided, and the ox unexpectedly treading on an uneven surface, or being compelled long to do so when ploughing a steep field, the weight of the animal will be unequally distributed on the pasterns, and severe sprain will be the result. This is indicated by the sudden lameness which comes on, and by the swelling, and heat, and tenderness being confined to one claw, and referable to the fetlock or pastern, or coffin-joints. Rest and fomentation, or the application of cold, with bleeding from the veins of the coronet, will usually remove this kind of lameness. The bleeding may be easily effected by means of a small fleam or lancet, for the veins of the foot of the ox are large and tortuous, and rise distinctly above the coronet, and climb up the pastern. It is the increased vascularity which often gives so serious a character to sprains of the coffin or pastern-joints in the ox, and disposes to stiffness of these joints.

The foot of the ox, or that part which is enclosed within the horny box, is liable to the same injuries and diseases as that of the horse; but they generally are not so difficult to treat, nor do they produce such destructive consequences, because the weight of the animal being divided between the two claws, the first concussion or injury is not so great, and the animal is able afterwards to spare the injured claw, by throwing a considerable portion or the whole of the weight on the sound one. Injuries of the feet arise from pricking in shoeing, wounds from nails or glass, or from the sole being bruised, and sometimes the horn being worn almost through, by travelling or working on hard roads.

It is generally believed that there is a constitutional tendency to diseases of the foot in cattle, resembling the rot in sheep; but this has never been satisfactorily proved, and the simplest explanation of the matter is, that inflammation was produced by some external cause; that it ran its usual course; that suppuration followed, and matter was formed; that it burrowed in various parts of the foot, and broke out at the coronet; that sinuses remained; that the ulcer took on an unhealthy character; fungus shooted up; in short, there was quitter or canker. This is a simple view of the case, and at once points out a mode of treatment, intelligible and generally successful.

It is true that *foul in the foot* is most prevalent in low marshy countries; but the hoof is there softened, macerated by its continual immersion in moisture, and rendered unable to resist the accidents to which it is occasionally exposed.

When a beast becomes suddenly lame, he should be taken up, and, if necessary, secured. The lameness will generally be referable to one claw. The heat, and tenderness, and redness, and enlargement round the coronet will prove this. The foot should be carefully examined: is there any prick or wound about the sole? if so, let the horn be pared away there—let the matter which is pent up within escape—let the horn be removed as far as it has separated from the sensible parts beneath—let a little butyr of antimony be applied over the denuded part—let a pledget of soft dry tow be bound tightly upon the part, and let the animal be placed in a dry yard or cow-house.

If there be no evident wound, let the foot of the beast be tried round with the pincers; and if he decidedly flinches when pressed on a particular part, let the foot be opened there—let the coronet be closely examined: is there any soft reddish shot upon it? if so, freely plunge the lancet into it.

If the examiner be foiled in this attempt to discover the seat of mischief, let him envelop the foot in a poultice; that will soften the parts, and cause even the horn to be a little more yielding, and will abate the inflammation; if it should be pure inflammation without previous mechanical injury, that will hasten the process of suppuration, and the matter will more quickly, and with less destruction to the neighboring parts, find its way to the coronet. As soon as it does so, the soft projecting red or black spot should be opened, and a probe should be introduced into the opening and the sinuses carefully ascertained, and every portion of detached horn removed from above them, and the healthy horn around thinned and smoothed. It will always in these cases be prudent to administer a dose of Epsom salts.

The character of the surface exposed should now be considered. If, the matter having been all evacuated, the wound or wounds have

a tolerably healthy appearance, a light application of the butyr of antimony, and that repeated daily, will soon induce a secretion of new horn; but if there be a portion of the surface that looks black or spongy, or the edges of which are separated from the parts around, here was, probably, the original seat of injury—the life of that portion has been destroyed and it must be removed—*it must slough out.* A poultice of linseed meal, with a fourth part of common turpentine, must be put on, changed twice in the day, and continued until the suppuration is complete. A light application of the butyr should then follow, or, in favorable cases, a pledget soaked in Friar's balsam should be placed on the wound, bound tightly down, and daily renewed; the removal of every portion of detached horn, dryness, firm but equable pressure on the part, and moderate stimulus of the exposed surface, are the principles which will carry the practitioner successfully through every case of foul in the foot.

Nothing has been said of the fungous excrescence between the claws, in order to remove which, as well as to stimulate the surface beneath and dispose it to throw out healthy horn, the cart-rope or the horse-hair line used to be introduced between the claws, and drawn backward and forward, inflicting sad and unnecessary torture on the animal. This fungus will rarely make its appearance, if the horn, which had lost its attachment to the living surface beneath, yet still continued to press upon it, has been carefully removed. If any fungus appear, it should be levelled by means of a sharp knife, and the caustic applied. There can be no doubt that pure inflammation, without wound or mechanical injury, does sometimes attack the feet of cattle, especially of those that are in high condition. On one day the beast is perfectly free from lameness, or illness of any kind; on the following day probably the foot is swelled, *the claws stand apart from each other,* they are unusually hot, and the animal can scarcely rest any portion of his weight on one foot; he is continually shifting his posture, or he lies down and cannot be induced to rise. If the beast be neglected, the inflammation and swelling increase until an ulcer appears at the division of the claws, and which cannot be healed until a considerable core has sloughed out.

A linseed-meal poultice should be applied to the part as soon as this inflammation is observed, and it may be easily retained in its situation by means of a cloth through which two holes have been cut to admit the claws. This will either abate the inflammation or hasten the suppuration; and as soon as the swelling begins to point, it should be opened. The poultice must be continued until this sloughing process has taken place, or the ulcer begins to have a healthy surface, a little common turpentine having been added to it. Proud flesh must be subdued, by the caustic; equal parts of verdigris and sugar of lead will constitute the best application for this purpose. Foul and fetid discharge must be corrected by the chloride of lime;

and when the ulcer looks healthy, the tincture of myrrh or Friar's balsam must be used.

By this mode of treatment, the disease will readily be subdued, but the application of corroding caustic substances in the early stage of it will add fuel to fire; and the suffering the abscess to remain unopen until the pus has burst its way through the thick skin of the leg will produce sinuses that will run in every direction, remain open month after month, and leave permanent lameness behind. Some have imagined that this variety of foul in the foot is contagious. That is not quite ascertained, although there are some suspicious cases on record; the farmer, therefore, will act prudently, who immediately separates the lame beast from the herd.

In one respect, these diseases of the feet of cattle differ materially from quitter or canker in the horse. There is a laminated connection between the hoof of the ox and the sensible parts beneath, as in the horse; but the horny plates of the hoof and the fleshy ones of the substance which covers the coffin-bone are not so wide or so deep, and therefore the attachment between the hoof and the foot is not so strong. Thence it happens that the matter finds great difficulty in forcing a way for itself in the foot of the horse, and deep sinuses are formed, which reach to, and corrode the bone, and there is sometimes core upon core to be detached, and portions of bone to be thrown off, and whence results the cankered state of the foot, and the difficulty of cure. In cattle, less resistance to the progress of the matter is experienced; the hoof is more easily separated from the parts beneath, and that which would produce deep ulceration and caries in the one, rarely to be perfectly repaired, leads to the casting of the hoof in the other, while the foot has received comparatively little injury. The form of the foot, in these cases, is much changed, and all its functions impaired in the one; in the other a new hoof speedily covers a foot that has escaped all serious detriment, and the animal becomes as useful as he ever was. Cases, however, do sometimes occur, in which the hoof is lengthened and curved, and twisted in a very curious way, and the coffin-bone takes on a similar distortion.

There is no *frog* in the foot of cattle, nor are there the provisions for the expansion and elasticity of the foot which we admire in the horse; therefore there is not any disease that can be considered as corresponding with the "*thrush*" in that animal, but there is occasionally something not much unlike *grease*. A sore appears upon the heel, not, however, so much in the form of a crack as of a circular superficial ulcer. It has a brown, unhealthy hue; fungus often springs from it, and it causes considerable lameness. It is best treated with the chloride of lime, or that and a strong solution of alum may be alternately applied. A bandage should seldom be used, because it can scarcely be put on without excoriating the

parts and increasing the evil, and because the ox is much more impatient of the restraint of the bandage than is the most fidgety or vicious horse.

Constant pain seems to prey speedily and injuriously on cattle. They have not the courage and endurance of resistance, and therefore it is that these diseases of the feet soon begin very materially to interfere with the condition of the beast. These things would indicate the propriety of having recourse to the operation of neurotomy. It is an operation which, resorted to in proper cases, will often be practised to relieve the torture, and to improve the condition of ruminants.

Homœopathic treatment.—Acidum phosphoricum is an excellent remedy in most cases. Others have yielded to the efficacy of *sulphur*, and of *carbon vegetabilis*, preceded by a few doses of *nux vomica*. Lux recommends the *bupodopurinum* as specific. *Mercurius solubilis* has often rendered great service in diseased feet. At the onset of the disease, when there is yet only a difficulty of walking, and some sensibility of the sole, *arnica* (internally and externally) and *arsenicum* may suffice for effecting a cure; however, even under such circumstances, *acidum phosphoricum* has succeeded more than once, so that it may be considered as the most useful.

CHAPTER XIX.

THE DISEASES OF THE SKIN.

Graziers know that the beast whose skin is not soft, and mellow, and elastic, can never carry any profitable quantity of flesh and fat; therefore they judge of the value of the animal even more by the handling than they do by the conformation of parts.

The skin is filled with innumerable little glands, which pour out an oily fluid, that softens and supplies it, so that we can easily take it between the finger and thumb, and raise it from the parts beneath; and while we are doing this, we are sensible of its peculiar mellowness and elasticity. At another time, or in another animal, the skin seems to cling to the muscles beneath, and feels harsh and rough when we handle it; but the skin is not altered or diseased; it is this secretion of oily fluid that is suspended. We attach the idea of health to the mellow skin, and of disease to the harsh and immovable one, because the experience of ourselves and of everybody else has confirmed this connection, and the principle is, that when one secretion is properly discharged the others will generally be so, and when one is interrupted the harmony of the system is too much disturbed for the animal to thrive or to be in vigor.

Then, as a symptom of a diseased state of the constitution generally, the attention is first directed to

HIDE-BOUND.

The term is very expressive—the hide seems to be bound, or to cling to the muscles and bones. It does not actually do so, but it has lost its softness, and we can no longer raise it, or move it about. The secretion of the oily fluid which supplies the skin is disturbed; this argues disturbance elsewhere, and the feeling of the skin usually indicates the degree of that disturbance.

With hide-bound is connected a rough and staring coat. The surface of the skin is hard and dry; the minute scales with which it is covered no longer yield to the hair, but separating themselves in every direction, they turn it in various ways, and so give to it that irregular and ragged appearance which is one of the characteristics of want of condition.

These two circumstances—hide-bound and a staring coat—are unerring indications of evil. A cow may be somewhat off her feed —she may hoose a little—she may have various little ailments; they should not be neglected; but while the skin is loose, and the hair lies smooth, the farmer has not much to fear; if, however, the coat begin to stare, and the skin to cling to the ribs, it behooves him to examine into the matter.

If the unthrifty appearance cannot be traced to any evident cause, still there can be no doubt that something is wrong. Hide-bound is rarely a primary disease; it is a symptom of disease, and oftener of disease of the digestive organs than of any other. A dose of physic should be given (eight ounces of sulphur, with half an ounce of ginger,) and a few mashes should be allowed. After this, medicines should be administered that have a tendency to rouse the vessels of the skin to their due action, as sulphur, nitre, and antimonial powder, with a small quantity of ginger. No direct tonic should be administered while the cause of this want of condition is unknown, but warm purgatives and diaphoretic medicines will often have a good effect.

MANGE.

This is the most serious among the diseases of the skin in cattle. The first symptom is a constant itchiness. The cow eagerly rubs herself against everything that she can get at. The hair comes quite off, or gets thin on various parts of the body. There are few scabs or sores; but either in consequence of the rubbing, or as an effect of the disease, a thick scurfiness appears, particularly along the back, and in patches on other places. It is first seen about the tail, and thence it spreads in every direction. The cow soon begins to lose condition, the ridge of her back becomes prominent, and her milk decreases, and sometimes is deteriorated in quality.

The causes are various; they are occasionally as opposite as it is possible for them to be. Too luxuriant food will produce it; it will more certainly follow starvation. The skin sympathizes with the overtaxed powers of digestion in the one case, and with the general debility of the frame in the other; and nothing is so certain of bringing on the worst kind of it as the sudden change from comparative starvation to luxuriant food. Want of cleanliness, although highly censurable, has been oftener accused as the cause of mange than it deserves; but to nothing can it more frequently be traced than to contagion.

The treatment is simple and effectual. The diseased cattle should be removed to some distant stable or shed where there can be no possible communication with the others. The disease, however produced, must be considered and treated as a local one. The scurfiness of the skin must first be got off, by means of a hard brush, or a

curry-comb, somewhat lightly applied. To this must follow the application of an ointment which appears to have a specific effect on the mange, and which must be well rubbed in with a soft brush, or, what is far better, with the hand, morning and night: there is no danger of the disease being communicated to the person so employed. The ointment must have sulphur as its basis, aided by turpentine, which somewhat irritates the skin, and disposes it to be acted upon by the sulphur; and, to render it still more efficacious, a small portion of mercury must be added. The following will be a safe and very effectual application—there are few cases which will resist its power. Take of flowers of sulphur a pound, common turpentine four ounces, strong mercurial ointment two ounces, and linseed oil a pint. Warm the oil and melt the turpentine in it; when they begin to get cool, add the sulphur, and stir the ingredients well together, and afterwards incorporate the blue ointment with the mass by rubbing them together.

Vast numbers of cattle have been lost by the use of stronger and poisonous applications. Corrosive sublimate, in the form of an almost saturated solution of it, is a favorite lotion with many practitioners. Arsenic—hellebore—tobacco have had their advocates, and have murdered thousands of cattle.

The practitioner must not, however, confine himself to mere local treatment; physic should always be administered. Sulphur, in doses of eight ounces every third day, will materially assist in effecting a cure; and on the intermediate days nothing better can be given than the powder recommended for hide-bound (p. 439.) Mashes also should be allowed every night.

Mange, neglected or improperly treated, may degenerate into a worse disease, but fortunately not one of frequent occurrence. The scurf will be succeeded by scabs—there have been cases in which the scabs have appeared from the beginning—and the skin becomes thickened and corrugated, and covered with scales, and occasionally the scales peel off, and corroding ulcers appear beneath.

The same ointment, but with double the quantity of mercury, must be used for this aggravated state of the disease, and a stronger alterative powder, consisting of two drachms of Ethiop's mineral, added to the one already recommended. All this mercury, however, must be used with caution, for it is not a drug that always agrees with cattle; and salivation would, temporarily at least, and in most cases permanently, injure the beast, both for the dairy and the pasture.

In those sadly aggravated cases that come under the observation of the practitioner, in which the whole of the skin is thickened and corrugated, with deep chaps running down on either side, or uniting together in various directions—when within the substance of the skin numerous tubercles can be felt, varying from the size of a millet-

seed to that of a kidney-bean—when the eyelids are swelled so that the animal can scarcely see, and a great quantity of mucus is discharged from them—when the nostrils and lips are thickened, and dense and yellow mucus runs from the nose—when, beginning from the knees and reaching almost to the hoofs, the intervals between the chaps are occupied by tuberculous grapes, of different sizes, and some of which discharge a serous fluid;—in such cases the surgeon may well be puzzled what to do.

The animal must be bled and physicked; but his strength must be supported by mashes and plenty of fresh green meat: he must be fomented all over many times every day, and he must be kept where he cannot communicate the infection. If the inflammation does not begin to subside, he must be bled again and again; the physic must be repeated; sulphur will constitute the best physic here, and he must be kept under its purgative influence: and, at at length, the skin beginning to supple—the cutaneous inflammation having, to a considerable degree, subsided—the ointment and the powder recommended for mange must be used. Should they not have sufficient effect, recourse must be had to the stronger ones prescribed for leprosy. Previous, however, to the use of either of the ointments, and after the inflammation has abated, the solution of the chloride of lime may be applied on two or three successive days with much advantage.

Homœopathic treatment.—Some doses of *sulphur* (one a day) is the first remedy to be employed. Then *staphysagria* should be administered, more especially when there are dartrous eruptions, with itching during the night. *Dulcamara* is good in the vesicular eruption, with yellowish serosity, which comes on after sudden cold, and which is accompanied by a discharge from the nose, as well as in dry and furfuraceous dark-colored eruptions. *Mezereum* is indicated in itchy tubercles, with redness of the skin; *arsenicum*, in case the appetite is impaired, with periodical diarrhœa.

MAD ITCH.

This is a disease peculiar to the valley of the Mississippi and its tributaries, and, on account of its name, is reserved for this place. It is, however, not a disease of the skin, but of the manyplus or manifolds. It is said to be found only in cattle following hogs in the corn-fields. The hogs chew the green corn-stalk, extracting the juice, and leaving the refuse. Cattle eagerly eat the chewed stalks; and not unfrequently these become impacted in the manyplus, and are then dry and indigestible. Cattle which are diseased by feeding on these corn-stalks, exhibit their diseased condition by a wildness of the eyes, and by rubbing the nose and head against any object near them, as trees or fences. This is so violently done, that they

tear the skin and flesh horribly. This is a disease, primarily, of the stomach, affecting the brain and the head generally. The remedy must be applied promptly, and, as in all inflammations, copious bleeding must be resorted to; and then should follow active medicine. The treatment prescribed for this disease at pages 313, 314, 315, 316 and 317, must be followed. The main reliance will be a thorough washing of the manifolds with water, administered by the stomach-pump.

Homœopathic treatment.—This will consist of, first, *aconitum*, and then *belladonna*, to be followed by *veratrum album*. These are to be given to abate the secondary effects of the disease. As to the cause, it can only be removed as prescribed at page 313 and the following ones; and the means are mainly mechanical. *Sulphur* and *mercurius vivus* may be given if there be costiveness; *nux vomica* if the fæces be hard; *opium* and *argilla* when nothing passes; and *plumbum* where the constipation is very obstinate.

LICE.

Connected with mange, the usual accompaniment, and probably the occasional cause of it, is the appearance of vermin on the skin. It cannot be supposed that they are originally produced by any disease or state of the skin; but the ova (eggs) of these animalculæ, floating in the atmosphere, find in the skin of cattle, under certain circumstances, and under those alone, a proper nidus, or place where they may be hatched into life. A beast in good health and condition will not have one of those insects upon him unless he mixes with lousy cattle; but if he be turned out in the straw-yard in winter, and is half-starved there, and his coat becomes rough, and matted, and foul, they will soon swarm upon him. By the constant irritation which they excite, they will predispose the skin to an attack of mange from other causes, if they do not actually produce it.

He who had not personal observation of the fact, would hardly believe how numerous they soon become. There are myriads of them on the hide of the ill-fated beast. They keep him in a constant state of torment, and are, in a manner, devouring him before his time. It cannot be surprising that they rapidly spread from one animal to another. The slightest contact, the lying on the same lair, or the feeding on the same pasture, is sufficient to enable them to be communicated from the infected beast to all the rest. The animalcule thrives everywhere, although the ovum did not find a proper nidus on the skin of the healthy beast; and the vermin, once established there, soon change the character of the skin, and cover it with scurf and mange.

Various powders and lotions have been recommended for the destruction of these parasites. A powder can scarcely be brought

into contact with a thousandth part of them; nor can a lotion, unless used in a quantity sufficient to kill the beast as well as those that are feeding upon him. An ointment is the most convenient application, and by dint of rubbing, a little of it may be made to go a great way. The common scab ointment for sheep (one part of strong mercurial ointment, and five of lard) will be effectual for this purpose; and if a little of it be well rubbed in, instead of a great deal being smeared over the animal, there will be no danger of salivation.

Homœopathic treatment.—Lice are destroyed in a few days with a decoction of *staphysagria*, or with a pomade prepared with three parts of axunge and one part of parsley-seed, pounded.

WARBLES.

Toward the latter part of the summer and the beginning of autumn, and especially in fine and warm weather, cattle out at pasture are frequently annoyed by a fly of the Diptera order and the Œstrus genus, that seems to sting them with great severity. The animal attacked runs bellowing from his companions, with his head and neck stretched out, and his tail extending straight from his body, and he seeks for refuge, if possible, in some pool or stream of water. (The fly seems to fear or to have an aversion to the water, and cattle are there exempt from its attack.) The whole herd, having previously been exposed to the same annoyance, are frightened, and scamper about in every direction, or, one and all, rush into the stream. Under the excitation of the moment, they disregard all control, and even oxen at work in the fields will sometimes betake themselves to flight with the plough at their heels, regardless of their driver, or of the incumbrance which they drag behind them.

The formidable enemy that causes this alarm, and seems to inflict so much torture, is the *Œstrus Bovis*, the Breeze, or Gad-fly, which, at this time, is seeking a habitation for its future young, and selects the hides of cattle for this purpose. It is said to choose the younger beasts, and those that are in highest condition. There has evidently been considerable exercise of selection, for a great many of the cattle in the same pastures will have only a few warbles on their backs, while others will, in a manner, be covered by them.

The *œstrus bovis* is the largest and most beautiful of this genus. Its head is white, and covered with soft down—its thorax yellow anteriorly, with four black longitudinal lines—the centre of the thorax is black, and the posterior part of an ashen color—the abdomen is also of an ashen color, with a wide black band in the centre, and covered posteriorly with yellow hair. It does not leave its chrysalis state until late in the summer, and is then eagerly employed in pro-

viding a habitation for its future progeny. It selects the back of the ox, at no great distance from the spine on either side, and alighting there, it speedily pierces the integument, deposits an egg in the cellular substance beneath it, and probably a small quantity of some acid, which speedily produces a little tumor on the part, and accounts for the apparent suffering of the animal.

The egg seems to be hatched before the wound is closed, and the larva, or maggot, occupies a small cyst or cell beneath it. The tail of the larva projects into this opening, and the insect is thus supplied with air, the principal air-vessels being placed posteriorly; while with the mouth, deep at the bottom of the abscess, it receives the pus, or other matter that is secreted there. A fluid, resembling pus, can always be squeezed from the tumor, and increasing in quantity as the animal approaches his change of form. In its early stage of existence the larva is white, like that of most other flies; but as it approaches its maturity, it becomes darker, and at length almost black. These little tumors form the residence of the larva, and are recognized by the name of *warbles*.

The abscess having been once formed, appears to be of little or no inconvenience to the beast on whose back it is found. It certainly does not interfere with his condition, and the butcher regards the existence of these warbles even as a proof of a disposition to thrive. The injury to the skin, however, is another affair, and the tanner would probably tell a different story. The larva, if undisturbed, continues in his cyst, until the month of June or July in the following year, and then forces itself through the aperture already described, and the accomplishment of which occupies two days. It is soft when it first escapes, but it soon hardens; and if it is fortunate enough to escape the birds, or if it does not fall into the water, which the cattle seem now instinctively to seek, as it were to destroy as many of their enemies as possible, it conceals itself in the nearest hiding-place it can find, where it remains motionless until it changes to a chrysalis, which is speedily effected; it continues in its new form about six weeks, and then bursts from its shell a perfect fly.

It is a very singular circumstance, that the escape of the larva from its prison on the back of the ox always takes place in the morning, and between six and eight o'clock.

Being also exposed to many dangers in its chrysaline state, it is then covered with a scaly box of great strength, and from which it would seem impossible for it ever to make its escape; but when its change is complete, and it begins to struggle within its prison, a valve at one end of its narrow house, and fastened only by a slight filament, flies open, and the insect wings its way, first to find its mate, and then to deposit its eggs on the cattle in the nearest pastures.

Some farmers are very careless about the existence of these warbles; others very properly endeavor to destroy the grub that inhab-

its them. This is effected in various ways—a little corrosive liquor is poured into the hole, or a red-hot needle introduced, or the larva is crushed or forced out by pressure with the finger and thumb. Although the existence of the warble is a kind of proof of the health and condition of the animal, yet there is no reason why the best beasts should be tormented by the gad-fly, or the strongest and best hides be perforated, and, in a manner, spoiled in their best parts. Although when the larva escapes or is expelled, the tumor soon subsides, the holes made are scarcely filled up during that season; and even a twelvemonth afterwards, a weakness of the hide, and disposition to crack, will show where the bot has been. If all the farmers could be induced to search for and destroy the insect when a larva, the cattle of that district might be nearly or quite freed from this pest.

ANGLE-BERRIES, OR WARTS.

Cattle are subject to various excrescences, growing from the cuticle at first, but afterwards identified with the true skin. They assume many forms, from that of scales of greater or less thickness, and accompanied sometimes by chaps and sores, to fungous growth, of different size and hardness, and bearing the character of warts. They are occasionally very numerous and exceedingly troublesome, and especially about the teats. When they grow about the eye-lids, they are a sad nuisance to the beast.

When they are only exfoliations and scales of the cuticle, friction with camphoretted oil will occasionally remove them. It has been known to disperse the warty excrescences. Mercurial preparations, whether blue ointment or corrosive sublimate and soap, are dangerous, but they will usually get rid of the angle-berries. When they are numerous, and particularly about the udder, the practitioner will probably try to remove the largest of them by means of a ligature passed round their roots. This, however, will often be an almost endless affair, and recourse must be had to the knife and the cautery. The cautery will stop the bleeding, destroy the root of the wart, and thus prevent its springing again. When they are small, they will be most successfully attacked by means of the nitrate of silver, being touched daily with it in a solid form, if they are few and distinct; or washed with a strong solution of it, if they are more numerous and scattered over a large surface. They have been attributed to various causes, as contusions, stings of insects, want of condition, inflammation of the skin; but in most cases the actual cause is unknown.

Homœopathic treatment.—Warts appear on the breast, belly, back, neck, tail; sometimes smooth, round, soft and broad; sometimes pediculated, chapped, spongy, hard and dry, or moist, painful or without feeling. For the cure of warts which are dry, smooth,

and not pediculated, *dulcamara* should be employed, and in some cases *sulphur;* for those which are ulcerated, *arsenicum;* for those which bleed readily and cause pain, *causticum.* Excrescences which are moist, incrusted, chapped, presenting a disgusting appearance, and frequently of an enormous size, require *thuja,* externally and internally, and the employment of this remedy must be continued for a long time. Small warts on the lips yield to ***calcarea carbonica.***

CHAPTER XX.

A LIST OF THE MEDICINES USED IN THE TREATMENT OF THE DISEASES OF CATTLE.

Alcohol.—There are two circumstances which not only render the practice of giving stimulants to cattle far more excusable than in the horse, but absolutely necessary; the first is, the disposition which all the inflammatory diseases of cattle have to take on a typhoid form, and assume a malignant character; and the second is, the construction of the stomachs of these animals, in consequence of which a considerable portion of the medicine falls into the comparatively insensible paunch. Hence, inflammation having been subdued, the practitioner is always anxious to support the strength of the constitution; and even while he is combating inflammation, he cautiously adds a stimulant to the purgative, in order that he may dispose the tissues with which that purgative may come into contact to be affected by it. Hence ginger forms an indispensable ingredient in every aperient drink; hence the recourse to wine in many cases of low fever; and hence also the foundation of, and the excuse for, the custom of adding the sound home-brewed ale to almost every purgative, and especially for young and weakly cattle, when evident inflammatory action does not forbid it. The fiery spices and the almost undiluted spirit administered by the cow-leech can never be justified; yet, in cattle-practice, the beneficial effect of the aperient often depends fully as much on the carminative by which it is accompanied, as on the purgative power of the drug itself.

Aloes.—It holds a secondary rank, or might be almost dismissed from the list of cattle aperients. It is always uncertain in its effect, and sometimes appears to be absolutely inert. Six ounces have been given without producing any appreciable effect. Still, however, as there is no case on record in which it has destroyed the ox by superpurgation, and as occasionally it does seem to exert some purgative effect, it may be admitted in combination with or alternating with other purgatives, when constipation is obstinate; few, however, would think of resorting to it in the first instance.

The Barbadoes aloes should be selected; and on account of the construction of the stomachs, it must be always administered in solution, for a ball would break through the floor of the œsophagean canal,

and be lost in the rumen. Two ounces of aloes, and one ounce of gum Arabic (in order to suspend the imperfectly dissolved portion of the aloes) should be put into a pint of boiling water, and the mixture frequently stirred during the first day; then two ounces of tincture of ginger are to be added, not only to prevent the mixture from fermenting, but because that aromatic seems to be so useful, and in a manner indispensable in cattle purgatives. The dose should consist of from half a pint to a pint of the solution, or from four to seven or eight drachms of the aloes. Some persons boil the aloes in the water, but the purgative effect of the drug is much lessened by this.

Aloes is very useful in the form of tincture. Eight ounces of powdered aloes and one ounce of powdered myrrh should be put into two quarts of rectified spirit, diluted with an equal quantity water. The mixture should be daily well shaken for a fortnight, when it will be fit for use. It is one of the best applications for recent wounds; and in old wounds especially, accompanied by any foulness of them, or discharge of fetid pus, nothing will be more serviceable than equal parts of this tincture and a solution of the chloride of lime.

Alteratives.—These are medicines that are supposed to have a slow yet beneficial effect in altering some diseased action of the vessels of the skin or of the organs of circulation or digestion. To a cow with yellows, or mange, or that cannot be made to acquire condition, or where the milk is diminishing, small quantities of medicine are often administered, under the tempting, but deceptive, term of *alteratives*. They had much better be let alone in the majority of cases. If a cow be really ill, let her be treated accordingly; let her be bled or physicked, or both; but let her not be nauseated, or her constitution ruined, by continually dosing her with various drugs. The want of condition and thriving in cattle is far more connected with a diseased state of their complicated stomachs, and particularly with obstruction in the manyplus, than with any other cause; the alteratives, then, should be small quantities of purgatives, with aromatics, as Epsom salts, or sulphur with ginger; or, what would be still preferable, rock salt in the manger for them to lick, or common salt mingled with their food. There can, however, be no doubt that in many cutaneous affections, and especially where mange is suspected, alterative medicines will be very beneficial. They should be composed of Æthiop's mineral, nitre, and sulphur, in the proportions of one, two, and four, and in daily doses of from half an ounce to an ounce.

Alum.—This is a useful astringent in diarrhœa, and especially in the purging of calves. It is best administered in the form of alum whey, which is composed of two drachms of powdered alum, dissolved in a pint of hot milk; a drachm of ginger may be added; and, if the purging be violent, a scruple of opium. Alum is rarely used externally in the treatment of cattle, unless for canker in the

mouth, and as a useful wash after the tongue has been lanced in blain; and unless in the form just mentioned, the less it is used internally the better.

Ammonia is not frequently used. In the form of hartshorn, it enters into the composition of some stimulating liniments, as in cases of palsy. The carbonate of ammonia has been extolled as a specific for hoove. The author always doubted this; he put it to the test, and it failed. It was administered as a chemical principle, it being supposed that the alkali would neutralize the acid gas that was extricated from the fermenting food; but it has been proved that this gas consists chiefly either of carburetted or sulphuretted hydrogen; besides which there is another consideration, that, except administered by means of Reed's pump, not one drop of the ammonia would find its way into the paunch.

Anodynes.—The one commonly used in cattle-practice is opium. The doses in which it may be employed have already been pointed out when treating of the diseases in which it is indicated.

Antimony.—There are but three preparations of it can be useful to the practitioner on cattle. The first is

Emetic Tartar, which, in doses from half a drachm to a drachm, and combined with nitre and digitalis, has great efficacy in lowering the circulation of the blood in inflammation of the lungs and every catarrhal affection, and particularly in that species of pleurisy to which cattle are so subject. Emetic tartar, rubbed down with lard, constitutes a powerful and very useful stimulant when applied to the skin.

Antimonial Powder—the powder of oxide of antimony with phosphate of lime. It is frequently sold in the shops under the name of James's Powder, and possesses all the properties of that more expensive drug. It is a useful febrifuge, in cases where it may not be advisable to nauseate the beast to too great a degree.

Chloride (Butyr) of Antimony.—Where it is wished that a caustic shall act only superficially, this is the most useful one that can be employed. It has a strong affinity for water, and therefore readily combines with the fluids belonging to the part to which it is applied, and so becomes diluted and comparatively powerless, and incapable of producing any deep and corroding mischief. It has also the advantage, that, by the change of color which it produces, it accurately marks the extent of its action, and therefore forms an unerring guide to the surgeon. For warts, foul in the foot, cankered foot, and for some indolent and unhealthy wounds, it is a valuable caustic and stimulant.

Antispasmodics.—Opium, for its general power, and particularly for its efficacy in locked-jaw, stands unrivalled. The spirits of turpentine and nitrous ether are useful in cases of colic.

Astringents.—These are few in number, but they are powerful:

alum, catechu, opium (an astringent because it is an anodyne), and blue vitriol, comprise the list; the first used both externally and internally; the two next internally; and the last internally, but chiefly powerful as arresting nasal discharge.

Blisters.—The thickness of the skin of cattle renders it somewhat difficult to produce any great degree of vesication. The part should be previously fomented with hot water, then thoroughly dried, and the blistering application well rubbed in. With these precautions, the common blister ointment will act very fairly; the turpentine tincture of cantharides still better; while an ointment composed by triturating one drachm of emetic tar with six of lard, will produce more powerful and deeper irritation, but not so much actual blistering. Sometimes boiling water; and in a few cases, and especially in bony enlargements about the legs attended by much lameness, the hot iron will be resorted to.

Calamine.—See Zinc.

Colombo.—A very useful tonic, and especially in those cases of debility which accompany or follow dysentery. It should be given in doses of from one to three drachms, combined with ginger.

Calomel.—See Mercury.

Camphor.—Used externally alone in cattle-practice. It is a component part in the liniments for palsy and garget.

Cantharides—the principal ingredient in all blistering ointments, and to which they owe their power. Corrosive sublimate, sulphuric acid, and euphorbium, may increase the torture of the animal, but they will generally blemish, and often lay the foundation for deep and corroding ulcers. The best blister ointment for cattle is composed of one part of cantharides (Spanish flies) finely powdered, three of lard, and one of yellow resin; the lard and the resin should be melted together, and the flies added when these ingredients begin to cool.

Carraways.—The powder of these seeds may be used as an occasional change for ginger; yet it is not so stomachic as the ginger, and is decidedly inferior to it, except in cases of flatulent colic. It may be given in doses, from half an ounce to two ounces.

Castor Oil.—An effectual and safe purgative for cattle, in doses from twelve ounces to a pint, and that will be properly employed when Epsom salts or other aperient drugs have not produced their desired effect. It is usually made into a kind of emulsion with the yolk of an egg. It is, however, to be doubted whether it is much superior to a less expensive purgative, the linseed oil.

Catechu is an extract from the wood of one of the acacia trees. It is much less expensive than the Gum Kino, and it is, when unadulterated, more effectual than that gum in subduing the diarrhœa of calves or adult cattle. The quantity, and the drugs with which it should be combined, have been stated in p. 338.

Caustics.—In the treatment of foul in the foot, these are indispensable, and the chloride (butyr) of antimony has no rival in the certainty with which it destroys the fungus or otherwise unhealthy surface to which it is applied, and the equal certainty of its destructive power being confined to the surface. For warts, angle-berries, &c., externally situated, the nitrate of silver in substance, or in the form of a strong solution, will be most effectual; for canker in the mouth, barbs, and paps, a strong solution of alum will be as useful as anything; and in order to stimulate indolent and unhealthy ulcers, nothing can compare with the diluted nitric acid.

Chalk.—See Lime.

Chamomile.—If it were necessary to add another tonic to the gentian and colombo, it would be the chamomile, and on the principle of not being so powerful as either of the others, and therefore used in somewhat doubtful cases, when, if the state of fever has not quite passed over, a stronger stimulant might have been prejudicial.

Charges.—These are thick adhesive plasters spread over parts that have been strained or weakened, or that are affected with rheumatism, and which, being applied warm, mingle so with the hair, that they cannot be separated for a long time afterwards. They give a permanent support to the part, and likewise exert a gentle but constant stimulating power. Old cows, weakened and rendered almost useless by a rheumatic affection of the loins, which is degenerating into palsy, often derive much benefit from the application of a charge. It is also useful when the joints are the seat of rheumatic lameness.

Clysters.—The lower or larger intestines of cattle, which, although long, are not capacious, and whose surface is not irregular and cellated, but perfectly smooth, so that a fluid will readily pass along them and to their full extent, will show the propriety of having frequent recourse to this mode of administering medicine. A soothing and emollient injection may be brought into contact with the inflamed and irritable surface of these intestines; or, on the other hand, that surface may be extensively and beneficially stimulated by the direct application of purgative medicine. The former is a most important consideration in diarrhœa and dysentery; and the latter is not of less moment when the comparative insensibility of the three first stomachs of cattle is regarded. Much may be done by means of the bladder and pipe, but the newly-invented stomach and enema-pump of Read enables the practitioner to derive from injections all the advantages that can be connected with their administration.

Copper.—There are but two compounds of this metal that have any value in cattle-practice, and they are the Blue Vitriol, or sulphate of copper, and Verdigris, or acetate of copper. The use of the first is limited to the coryza, or inflammation of and defluxion

from the nose in cattle, accompanied by little or no cough or fever, and which is sometimes in a manner epidemic. The manner of administering it is described in p. 183. As a caustic, the blue vitriol is altogether superseded by those mentioned under that head.

Verdigris is employed externally only, in one of the varieties of foul in the foot, in order to repress fungous growths. It is mixed with an equal portion of the sugar of lead, reduced to a fine powder, and sprinkled on the diseased surface.

Cordials.—These are destructively abused by many cow-leeches, but, as has been again and again stated, there is that in the structure and constitution of cattle, which will excuse their administration much oftener than in the horse. Except in extreme cases, and when their use is sanctioned by the decision of a competent veterinary practitioner, they should not extend beyond good home-brewed ale, and ginger and carraways.

Corrosive Sublimate.—See Mercury.

Croton Seeds.—These can scarcely be admitted into practice on ordinary occasions, or as a usual purgative; but in cases of phrenitis, tetanus, inflammatory fever, and in those strange constipations which so often puzzle and annoy, the Croton seed, in doses of from ten to sixteen grains, may be allowed. The bowels having been opened, the practitioner will keep up the purgative action by means of a milder and safer aperient. The seeds should be kept in a close bottle, and when wanted, should be deprived of their shells, and pounded for use. The farina soon loses its power, and the oil is shamefully adulterated.

Diaphoretics.—The thick hide of the ox forbids us to expect much advantage from those drugs which are supposed to have their principal influence determined to the skin, and thus to increase the sensible and insensible perspiration; yet emetic tartar and sulphur are, to a considerable extent, valuable in cases of fever—and the latter most certainly in cutaneous eruption and mange, by opening the pores of the skin, or exciting its vessels to healthy action. One, however, of the best diaphoretics is that which has been comparatively lately introduced in the general management of cattle, viz., friction applied to the skin. It needs but the slightest observation to be convinced that the health of the stall-fed beast, and his thriving and getting into condition, are materially promoted by the liberal use of the brush, and sometimes even of the curry-comb.

Digitalis (Foxglove.)—The leaves of this plant, gathered about the flowering season, dried, kept in the dark, and powdered when wanted, are most valuable in diminishing the frequency of the pulse, and the general irritability of the system in cattle. A reference to the treatment of almost every febrile disease will illustrate this. The dose is from half a drachm to a drachm, with emetic tartar, nitre and sulphur, and administered twice or thrice in the day, according

to the urgency of the case. The practitioner must not be alarmed at the intermittent pulse which is produced. It is by means of certain pauses and intermissions in the action of the heart, that the rapidity of the circulation is diminished when this drug is exhibited. The intermittent pulse is that which the practitioner will be anxious to obtain, and which he will generally regard as the harbinger of returning health.

Diuretics.—They are allowable and beneficial in swelled legs, foul in the foot, and all dropsical affections, while they advantageously alternate with other medicines in the treatment of mange, and all cutaneous affections, and in cases of mild or chronic fever. Nitre and liquid turpentine are the best diuretics; and almost the only ones on which dependence can be placed. The doses have been already pointed out.

Drinks.—It is needless again to explain the reason why all medicines that cannot be concealed in the food must be administered to cattle in the form of drinks. If they are exhibited in a solid form, they will break through the floor of the œsophagean canal, and enter the rumen. Farriers and cow-leeches, however, often give to their drinks the force and momentum of a ball, by the large vessels from which they are poured all at once down the throat. There are few things of more consequence than attention to the manner in which a drink is administered.

Elder.—The leaf of this tree is used boiled in lard. It forms one of the most soothing and suppling ointments that can be applied. The practitioner should make his own elder ointment, for he will often receive from the druggist an irritating unguent formed of lard colored with verdigris, instead of the emollient one furnished by the elder.

Epsom Salts.—See Magnesia.

Fomentations.—If, owing to the greater thickness of the skin, these are not quite so effectual in cattle as in the horse, yet, as opening the pores of the skin and promoting perspiration in the part, and thus abating local swellings, and relieving pain, and lessening inflammation, they are often exceedingly serviceable. The practitioner may use the decoction of what herbs he pleases, but the chief virtue of the fomentation depends on the warmth of the water.

Gentian.—An excellent stomachic and tonic, whether at the close of illness, or as a remedy for chronic debility. Its dose varies from one to four drachms, and should be almost invariably combined with ginger.

Ginger.—The very best aromatic in the list of cordials for cattle, and, with the exception of carraways, superseding all the rest. The dose will vary from half a drachm to four drachms.

Goulard's Extract.—See Lead.

Hellebore, Black.—The root of it forms an excellent seton when

passed through the dew-lap; it produces plenty of swelling and discharge, and rarely or never runs on to gangrene.

Injections.—See Clysters.

Iodine.—The use of this mineral is limited to a few cases, but there its effect is truly admirable. It will scarcely ever fail of dispersing enlargements of the glands, or hardened tumors, whether under or at the side of the jaw, or round the joints. One part of hydriodate of potash must be triturated with seven parts of lard, and the ointment daily and well rubbed on and round the part. Indurations of the udder seldom resist its power, unless the ulcerative process has already commenced.

There is a still more important use to which this drug may be applied. It possesses some power to arrest the growth of tubercles in the lungs, and even to disperse them when recently formed. It is only since the former part of this work was written that the attention of the author has been so strongly directed to this property of iodine, and that he has had such extensive opportunities of putting it to the test. He will not say that he has discovered a specific for phthisis or consumption in cattle, but he has saved some that would otherwise have perished, and, for a while, prolonged the existence and somewhat restored the condition of more. He would urge the proprietor of cattle, and more especially his fellow-practitioners, to study closely the symptoms of phthisis, as detailed in pages 272, 273; to make themselves masters of the inward, feeble, painful, hoarse, gurgling cough of consumption; and as soon as they are assured that this termination or consequence of catarrh, or pneumonia, or pleurisy, begins to have existence—that tubercles have been formed, and, perhaps, have begun to suppurate, let them have recourse to the iodine, in the form of the hydriodate of potash, given in a small mash in doses of three grains morning and evening at the commencement of the treatment, and gradually increased to six or eight grains. To this should be added proper attention to comfort; yet not too much nursing; and free access to succulent, but not stimulating, food; and the medicine should be continued not only until the general condition of the beast begins to improve, but until the character of the cough has been essentially changed.

Ipecacuanha.—This drug is used in the composition of the Dover's, or compound ipecacuanha powder, which has been recommended by some practitioners in the treatment of dysentery. It is thus made:—"Take ipecacuanha root powdered, and opium also in powder, of each a drachm, and sulphate of potash an ounce. Rub them together to a fine powder." The dose is from two to four drachms. This, however, is not an efficient medicine for such a disease.

Lard.—This is the principal basis of all ointments.

Laudanum.—See Opium.

Lead, Sugar of—(Superacetate of Lead.)—This, mixed with the subacetate of copper (verdigris, which see,) forms a useful caustic for the destruction of fungous growths.

Goulard's Extract.—(Liquor Plumbi Superacetatis.)—When the skin is unbroken, this preparation of lead is completely thrown away, whether used either as a lotion to subdue inflammation, or to disperse tumors or effusions. It is principally serviceable, applied in a very dilute form, to abate inflammation of the eye.

White Lead (Subcarbonas Plumbi) is the basis of a cooling, drying ointment, used chiefly for excoriations, or superficial wounds.

Lime. Carbonate of Lime, Chalk.—This is a useful ingredient in all the drinks given in diarrhœa or dysentery. In every stage of these diseases there is a tendency in the fourth stomach, and perhaps in the intestines, to generate a considerable quantity of acid, than which a greater source of irritation can scarcely be imagined. The chalk, or the alkali of the chalk, will unite with this acid, and neutralize it, and render it harmless. In the diarrhœa of the calf it is absolutely indispensable, for there the acid principle is frequently developed to a great degree. The dose will vary from a drachm to an ounce.

Chloride of Lime.—The list of medicines for cattle does not contain anything more valuable than this. As a disinfectant—if the walls, the floor, and the furniture of the cow-house or stable, are twice or thrice well washed with it, the sound cattle may return to the building with perfect safety, however contagious may have been the disease of those that had previously perished there. Applied to the pudenda of the cow that has aborted, it destroys that peculiar smell which causes abortion in others, more readily than any preparation of the most powerful or nauseous ingredient. In blain, garget, foul in the foot, and sloughing ulcers of every description, it removes the fetor; and, if the process of decomposition has not proceeded too far, gives a healthy surface to the ulcers which nothing else could bring about—and, administered internally in blain, in the malignant epidemic, and in diarrhœa and dysentery, it is of essential service. In the last disease it is particularly beneficial in changing the nature of the intestinal discharge, and depriving it of its putridity and infection, and disposing the surface of the intestine to take on a more healthy character. Half an ounce of the powder, dissolved in a gallon of water, will give a solution of sufficient strength, both as a disinfectant applied to the cow-house, and for external and internal use as it regards the animal.

Linseed.—Nothing can compare with the linseed meal as an emollient poultice—if the ulcer is foul, a little of the chloride of lime should be mixed with it. If the object of the poultice is to bring an ulcer into a proper state of suppuration, a little common turpentine may be added; but the cruelly-torturing caustics of the

cow-leech and the farrier should never disgrace the regular practitioner.

An excellent mash in cases of catarrh or sore-throat, and as an emollient in any intestinal affection, is made by adding bran to an infusion of linseed.

Linseed Oil.—This is little inferior to castor oil as a purgative; it is much cheaper, and it is equally safe. Where the case seems to indicate an oily purgative, and the first dose of castor oil fails, it may be followed up by smaller doses of linseed oil, until the desired effect is produced.

Magnesia, Sulphate of. Epsom Salts.—This may be regarded as the staple purgative of cattle. It is as safe as Glauber's salts; it is more certain, and it will dissolve in one-third of the quantity of water. The first dose of physic should always consist of the Epsom salts, quickened in its action, in extreme cases, by the farina of the Croton-nut; the purgative effect may be kept up by means of sulphur or Epsom salts, in doses of six ounces of the former, or eight of the latter, as the state of the animal may appear to require. The medium dose is about a pound, with a quarter of an ounce of ginger, but a pound and a half may be given to a large beast without the slightest danger.

Mashes are very useful in cattle-practice, not so much to prepare for physic, or to get into condition, as to form a soothing and cooling substitute, when the case requires a temporary abstinence from dry and stimulating food. They may be composed, like those of the horse, of bran only, with hot or cold water; or of bran with a decoction of linseed. In cases of debility, steeped or ground oats may be mixed with the bran, or malt may be used as a substitute for the bran and oats.

Mercury. Mercurial Ointment.—The practitioner should be very cautious in his use of this on cattle. Indeed, it is scarcely allowable except in a very diluted state, and with the common sulphur ointment, in bad cases of mange; or a small quantity of it may be mixed with lard for the destruction of vermin.

Sulphate of Mercury. Æthiop's Mineral.—A very useful alterative combined with sulphur and nitre, where there is any cutaneous affection. The circumstances under which it may be administered, and the doses, will be found in various parts of this work.

Proto-chloride of Mercury. Calomel.—This should rarely be given to cattle, and never as a purgative. In chronic inflammation of the liver, it often has a decidedly injurious effect: in jaundice, caused by a gall-stone obstructing the biliary ducts, or in that of a more chronic nature accompanied by debility and declining condition, the experience of the writer will not warrant him in recommending the administration of calomel: he would, on the contrary, be disposed to confine its use to dysentery, in which, combined with and guarded

by opium, irritation is allayed, while the natural action of the bowels is promoted.

Bichloride of Mercury. Corrosive Sublimate.—This drug may almost be dispensed with by the practitioner on cattle. It can never be administered internally; it is highly dangerous used externally in considerable or efficient quantity for the cure of mange or any cutaneous eruption; and as a caustic there are many as good.

Mint.—An infusion or decoction of this plant will be a useful vehicle in which other medicines may be administered for the cure of diarrhœa or colic.

Myrrh.—The tincture of myrrh is a useful application to wounds, and is also applied to the cankered mouth; but it contains nothing to render it preferable to the tincture of aloes in the former case, or a solution of alum in the latter.

Nitre—See Potash.

Nitrous Ether, Spirit of.—A favorite medicine with many practitioners in the advanced stages of fever. It is said to rouse, to a certain degree, the exhausted powers of the animal, while it rarely brings back the dangerous febrile action that was subsiding. It is not, however, a stimulant to which the author has often dared to have recourse, except in the advanced stages of epidemic catarrh, or the malignant epidemic. The dose should not exceed half an ounce.

Nux Vomica.—This is not introduced from any experience which the author has had of its efficacy, but from the favorable opinion which some continental veterinarians have expressed of it in the cure of palsy. The doses which they gave consisted of more than an ounce. The author has tried the nux vomica, and its essential principle, the strychnine, as a cure for palsy in the dog, but never with success.

Opium.—As an anti-spasmodic, an allayer of irritation, and an astringent because it does allay irritation, opium stands unrivalled. It is that on which the chief, or almost the only dependence is placed in locked-jaw. A colic drink would lose the greater part of its efficacy without it; and if it were left out of the medicines for diarrhœa and dysentery, almost every other drug would be administered in vain. It is most conveniently given in the form of powder, and held in suspension with other medicines in thick gruel.

The tincture of opium (laudanum) is useful in inflammation of the eyes; and a poultice of linseed meal made with a decoction of poppy-heads, often has an admirable effect when applied to irritable ulcers, or to parts laboring under much inflammation.

Pitch.—This is only useful as the principal ingredient in charges, so useful in cases of palsy, or sprain, or chronic local debility.

Plasters.—See Charges.

Potash. Nitrate of Nitre.—As useful to cattle as to the horse. It has an immediate effect in abating inflammation, and it is a mild

diuretic. The dose would vary from two to four drachms. When dissolved in water, it much lowers the temperature of that fluid, and therefore the solution, applied immediately after it is made, forms an excellent application in cases of sprains, or where there is much superficial inflammation without any lesion of the skin. Combined with antimonial powder, or emetic tartar and digitalis, it forms an almost indispensable ingredient in every fever drink.

Sulphur of Potash.—An ingredient in the Dover's powder.

Poultices.—These are justly valued for abating inflammation, cleansing wounds, and disposing them to heal. In some cases of foul in the foot, and especially in that most painful and occasionally fatal variety whose immediate seat is at the division of the pasterns, also in ulcers about the throat or joints, and in garget, poultices can scarcely be dispensed with. The basis will generally be linseed meal, rendered even more soothing by opium; or to which activity may be given by the addition of common turpentine or chloride of lime.

Rye, Ergot of.—The spurred rye has lately, and with considerable advantage, been introduced into veterinary practice in protracted or difficult parturition, in order to stimulate the uterus to renewed and increased action, when the labor pains appeared to be subsiding.

Setons.—The use of setons in practice on the diseases of cattle is in a manner limited to the passing of a piece of hair, rope, or of black hellebore root through the dewlap; and, as exciting inflammation in the neighborhood of the diseased part, and thus lessening the original one, and causing a determination of blood to a greater or less extent to this new seat of irritation, they are useful both in acute and chronic inflammation of the respiratory organs. In young cattle rapidly thriving, and placed in pasture perhaps a little too luxuriant, permanent setons are highly beneficial. They act as a salutary drain, and prevent that accumulation of the circulating fluid, which is the usual cause of inflammatory fever and other fatal complaints.

Sulphate of Soda. Glauber's Salts.—A very common purgative for cattle; and a very good one, but inconvenient on account of its requiring three times its weight of water in order to dissolve it, and also on account of its so readily efflorescing when it is exposed to the atmosphere, and in this state of efflorescence or powder, becoming more purgative than when in its crystalline form. The practitioner sometimes finds it a little difficult to calculate the amount of the dose which he should give, on account of this variation in form and effect; and this may explain the occasional uncertainty of the Glauber's salts. The Epsom salts, a very little dearer, dissolving in its own weight of water, and retaining the same form and the same purgative power under every state of the atmosphere or of exposure to it, is now rapidly superseding the Glauber's.

Chloride of Sodium. Common Salt.—The experience of almost every farmer will now confirm the benefit derived from the mixture

of salt with the food of cattle. It appears to be the natural and universal stimulus to the digestive organs of animated beings. In this place, however, its medicinal power alone is the subject of consideration. It is a purgative, second to the Epsom salts in the first instance; and, whether from the effect of the change of medicine, or of some chemical composition or decomposition which takes place, it is the surest aperient that can be given when the Epsom salts has failed; but the writer does once more indignantly protest against the disgraceful, beastly menstruum in which it is frequently administered. It is a tonic as well as a purgative, and therefore perhaps somewhat objectionable in the early stage of fever. It frequently recalls the appetite more speedily than any stomachic. When a dose of it is given to the animal recovering from acute disease, debilitated, listless, careless about or refusing its food, it sometimes has an almost magical effect in creating a disposition to feed. It is a vermifuge which, in cattle, seldom fails.

Silver, Nitrate of. Lunar Caustic.—Used for the destruction of warts, either in its solid state, or that of a strong solution; and, from the full command which the operator has over it, and the firm eschar which it forms, is the very best caustic that can be applied to a wound inflicted by the bite of a rabid dog.

Sulphur.—A very good aperient when the object is merely to evacuate the bowels, or when there is any cutaneous affection; but not sufficiently powerful in cases of fever: yet even there purgation, once established, may be kept up by means of it. The dose varies from eight to twelve ounces. As an alterative for hide-bound, mange, or generally unthrifty appearance, it is excellent combined with Æthiop's mineral and nitre; and it constitutes the basis of every ointment for the cure of mange.

Tonics.—These are indicated in cases of great, and especially of chronic debility, but, administered injudiously, they have destroyed thousands of beasts. They have done so when they have been poured in while the fever continued, or too soon after the subsidence of the fever, and when too great a disposition to its reappearance prevailed. When disease has been once removed, the powers of nature are usually sufficient to re-establish health. Gentian, colombo, and cascarilla, are the best, and almost the only safe tonics for cattle.

Turmeric, or colored pea-flour, for it is seldom anything more, is fit only to give that yellow color to cattle-medicines, which long usage has accustomed the cow-herd and the cow-leech to consider as indispensable.

Turpentine.—Several of the products of the fir tree are more or less useful in the medical treatment of cattle.

Tar, spread upon coarse cloth, is the best covering for broken horns, and excludes both the fly and the atmospheric air. It is useful for the same purpose in cases of wounds puncturing the belly or

chest. Alone, or in combination with some greasy matter, it is used to defend sore diseased feet from becoming wet or bruised.

Pitch is the principal ingredient in plasters.

Common Liquid Turpentine is useful as a *digestive*, or to produce a healthy appearance or action in wounds, and dispose them to heal. For this purpose it is added to the linseed poultice or to the simple ointment. Some practitioners administer it as a diuretic, and with good effect.

Oil, or Spirit of turpentine, is applied as an external irritant, either alone, or in the form of a tincture of cantharides. It is administered internally in colic; and some give it in red-water with a view to cause the debilitated blood-vessels to contract, and thus arrest the passive hæmorrhage which they imagine is then taking place. From the rapidity and great extent with which it is taken up by the absorbents, and carried into the circulation, and the destructive effect which it is known to have on intestinal worms when otherwise brought into contact with them, the trial of its power would be justified in bronchitis, the too frequent and fatal concomitant of which is the presence of thousands of worms in the air-passages.

Resin is often used to give consistence to plasters, where the degree of irration which it might produce is not regarded, or would be beneficial.

Vinegar.—This used to be considered almost a specific in distension of the rumen with gas, but on what principle it would be difficult to explain. It has also been given with manifest impropriety in cases of fever. On the thick skin of the ox it can have little preference to hot water as a fomentation, and may with no great loss be erased from the list of medicines.

Wax.—Its only use is to give consistence to ointments and plasters.

Zinc. Native Carbonate of Calamine.—This is the basis of an ointment which, from its soothing, and, at the same time, drying qualities, is termed, in various parts of this work, "the healing ointment." It is useful in superficial wounds, and in deeper ones when they have been brought to a healthy character.

White Vitriol.—This is a useful tonic application to the eyes, when the inflammation has been subdued, and debility of the vessels alone remains. It is particularly useful after inflammation of the haw of the eye. Some administer it in red-water, and others in dysentery very improperly. As a general caustic it is superseded by many others.

INDEX.

Aberdeenshire cattle, description of the, 52, 53, 54.
Aberdeenshire cattle, origin of the present breed of, 53.
Abomasum, the internal structure of, 286, 288, 290, 293.
Abomasum, diseases of the, 317.
Abortion, the symptoms of, 382.
Abortion, the usual causes of, 383.
Abortion, precautions to prevent the recurrence of, 386.
Age, the natural, of cattle, 194.
Age, as indicated by the horns, 150.
Age, as indicated by the teeth, 188.
Aislaby family of Durham and Studley, 112.
Alderney cattle, account of them, 138.
Althorp, Lord, cut of his bull, 109.
Althorp, Lord, cuts of his cow and heifer, 106, 107.
Aloes, not a good purgative for cattle, 447.
Alteratives, their nature, and the best composition of them, 448.
Alum, the medicinal properties of, 448.
Ammonia, the medicinal properties of, 449.
Anglesey cattle, description of, 39.
Angus polled cattle, 71.
Angus polled cattle, difference between them and the Galloways, 72
Antimony, the medicinal properties of, 449.
Apoplexy, symptoms and treatment of, 164.
Argyleshire, description of the cattle, and their management, 47.
Arteries, their structure and functions, 222.
Arteries, the smallness of, in the ox, compared with the veins, 217.
Astringents, the best for cattle, 449.
Ayrshire cow, Mr. Aiton's description of her, 55.
Ayrshire cow, origin of, 56, 57.
Ayrshire cow, the present, 59.
Ayrshire cow, compared with the Alderney, Holderness, and Devon, 60.
Ayrshire cow, the quantity of her milk, and the quantity of butter, 59, 60.

Badsworth, Mr. Mitton's old bull, description of, 126.
Bakewell, Mr., the great improver of the long horns, 83.
Bakewell, Mr., his supposed principles, as stated by Mr. Marshall, 84.
Bakewell, Mr., description of his cattle, 85.
Bakewell, Mr., his benevolent character, 85.
Barbs in the mouth, treatment of, 206.
Bars of the mouth, description of, 186.
Berry, the Rev. H., his account of the short horns, 95.
Bile, the composition and uses of, 320, 331,
Black water, the nature and treatment of, 373.
Bladder, inversion of the, 381.
Bladder, protrusion of, treatment of, 398.
Bladder, on rupture of the, 380.
Bladder, stone in the, symptoms and treatment of, 378.
Blain, the symptoms and treatment of, 196.
Blain, contagious, 197.
Blain, sometimes epidemic, 197.
Bleeding, the rule by which it should be guided, 218.
Bleeding, places, the preferable, 218.
Blisters, the difficulty of raising them in cattle, 266.
Blood, determination of to the brain, 163.
Blown—See "Hoove."
Bloxedge, the sire of the long-horns, an account of him, 83.
Bolinbroke, an early short-horn bull, an account of him, 99.
Bone of the heart, description of the, 222.
Brain, description of the, 153.
Brain, inflammation of the, 164.
Brain, hydatids in the, 162.
Breast bone, description of the, 238.

Breast, the projecting and wide, advantage of, 237, 238.
Brisket, description of the, 239.
Brisket, remarkable deepness of, in some cattle, 240.
British cattle, early history of, 11.
British cattle, the original were probably middle-horned, 13.
Bronchitis, nature and treatment of, 262.
Bronchitis, the air-passages filled with worms in, 263.
Butter, experiments to ascertain the various quantities of, from different breeds, 133.

Cæcum, description of the, 330, 332.
Cæsarian operation, description of, and when justifiable, 393.
Calamine, the basis of the best healing ointment for, 450.
Calculi in the rumen of cattle, 299, 360,
Calculi in the kidney, composition, symptoms, and treatment of, 377.
Calculi, urinary, ditto, 378.
Colombo, a useful tonic, 450.
Calomel, the cases in which it should be used, 450.
Calves, diseases and management of, 421.
Calving, the treatment of the cow before it, 387.
Calving, natural, the treatment of, 388.
Calving, the power of ergot of rye in exciting the labor pains, 389.
Calving, the management of unnatural presentations, 391.
Calving, when the calf should be cut away, and description of the operation, 395.
Calving, on retention of the fœtus, 398.
Calving, attention to the cow after it, 399.
Camphor, its medicinal properties, 450
Cancer of the eye, treatment of, 162.
Cantharides, the basis of the best blister application, 450.
Capillary vessels, description of them, 223.
Carotid artery, description of the, 205, 206.
Carraway, a useful aromatic, 450.
Castor oil, the use of it as a medicine, 450.
Castration of calves, the various methods of, 426.
Castration will often remove rupture in the calf, 364.
Cataract, treatment of, 162.
Catarrh, nature and treatment of, 246.
Catarrh, the necessity of attention to it on its first appearance, 247.
Catarrh, epidemic, symptoms of, 247.
Catechu, its useful astringent properties, 450.
Cattle, the proper points of, generally, 16,
Cattle, wild, account of, 11, 12.
Caustics, those used in cattle practice, 450.
Chalk, its utility in the treatment of dysentery and diarrhœa, 346, 451.
Chamomile, its tonic properties, 451.
Charge, Mr., an account of his fat seven-year-old ox, 104.
Charges, the use of, and the method of applying, 451.
Chest, the advantage of a capacious one in cattle, 16.
Chest, the proper form of, 236.
Chloride of lime, the value of, 308, 455.
Choking in cattle, treatment of, 279, 281.
Chyle, its nature and formation, 331.
Cleansing.—See Placenta.
Cleansing drink, the best, 400.
Clue-bound, treatment of, 313, 314
Clysters, the benefit of, 451.
Coates, Mr. G., the author of the "Short-Horned Herd Book," 102.
Colic, flatulent, its symptoms, nature, and treatment, 348.
Colic, spasmodic, its symptoms, nature, and treatment, 350.
Colic, spasmodic, too often leads on to strangulation of the intestines, 350.
Colling, Mr. Charles, 97.
Colling, Mr. Charles, an account of the cross of his cattle with the Galloway, 99.
Colling, Mr. Charles, a detailed account of his sale of the improved short-horns, 100.
Colling, Robert, a successful improver of the short-horns, 110.
Colling, Robert, the sale of his stock, 109.
Colon, description of the, 330, 332.
Colors, the prevailing ones of short-horns, 109.
Constipation, the treatment of, 355, 423.
Consumption, nature and treatment, 272.
Consumption, the peculiar cough of, 274.
Consumption, delusive character and progress of, 274.
Copper, the compounds of, used in cattle practice, 451.
Cordials, the use and abuse of, 452.
Cords, the nature and treatment of, 351.
Cork-screw probang, description of the, 282.
Corrosive sublimate, its use in cattle practice, 452.
Corrosive sublimate, the treatment of poisoning by, 311.
Coryza, the nature and treatment of, 182.
Cow-pox, distinction between the true and the false, 420.
Cow-pox, history of its establishment as a preventive against small-pox, 420.
Craven, the native country of the long-horns, 81.
Cravens, two distinct breeds of, the smaller and larger, 81.
Croton, a powerful purgative, 452.
Cud, loss of the, treatment of, 309.

D, Mr. Bakewell's bull, account of, 86.
Derbyshire cattle, account of, 93.
Devon cattle, 15.
Devon cattle, for the dairy, 23.

Devon ox, his activity his most valuable quality, 22.
Devon ox, his qualities for grazing, 23.
Devon ox, trial of his fattening properties with different breeds, 69, 70.
Devon, South, the cattle of, 24, 25.
Devon, South, comparison between them and the Devons, 25.
Diaphragm, rupture of the, 365.
Diarrhœa, acute, the nature and treatment of, 338.
Diarrhœa, distinction between it and dysentery, 338.
Diarrhœa, chronic, the nature and treatment of, 339.
Diarrhœa in calves, nature and treatment of, 424.
Digitalis, its medicinal properties, 452.
Distension of the rumen by food, nature and treatment of, 301.
Distension of the rumen by gas, nature and treatment of, 303.
Dropsy, general remarks on the causes and treatment of, 358.
Drying a cow, the proper period for, 388.
Duodenum, description of the, 330.
Durham ox, an account of the, 98.
Dysentery, causes and symptoms of, 340.
Dysentery, appearances of, after death, 342.
Dysentery is inflammation of the mucous membrane of the large intestines, 343.
Dysentery, treatment of it, 342.
Dysentery, the value of the chloride of lime in the treatment of it, 345.

Ear, description of the, 154.
Ear, the form and shape of, connected with the beauty of the animal, 154.
Ear, the diseases of the, 154.
Earth, the eating of it, prevents the fermentation of the food, 187.
East Indian cattle, an account of the, 149.
Elder, the leaves of, make a good soothing ointment, 453.
Embryotomy, when justifiable, and a description of the operation, 395.
Emetic, tartar, the use of, 449.
Enteritis, symptoms of, 334.
Enteritis, appearances after death, 335.
Enteritis, causes and treatment of, 336.
Epidemic catarrh.—See Catarrh.
Epidemics.—See Murrain.
Epidemic sore feet and mouth of 1840 and 1841, 256.
Epilepsy, the treatment of, 171.
Epsom salt, the best purgative, 453.
Ergot of rye, its power in stimulating the womb to action, 389.
Exeter, description of the vale of, 25.
Eye, general description of the, 156.
Eye, inflammation of the, the nature and treatment of, 159.
Eye, worm in the, treatment of, 162.
Eye, wounds of the, management of, 156
Eyelids, description of the, 157.
Eyelids, diseases of the, 157.

Farcy in cattle, 183.
Fardel-bound, description of it, 313.
Feet, the, description of, 143.
Feet, diseases of the, 432, 433.
Feet, epidemic sore, of 1840, and '41, 256.
Fever, intermittent, its symptoms and treatment, 225.
Fever, pure or idiopathic, often exist does in cattle, 224.
Fever, pure or idiopathic, its symptoms and treatment, 224.
Fever, symptomatic, frequent and dangerous, 225.
Fever, inflammatory, its nature and treatment, 225.
Fever, typhus, its nature and treatment, 233.
Firing, an advantageous mode of, for some bony tumors, 156.
Fits, the treatment of, 171.
Flooding after calving, treatment of, 401.
Fluke-worm, the, a cause of jaundice, 326.
Fœtus, retention of it for a long time without injury, 398.
Food, its changes in the stomachs, 294.
Food, how conveyed into the reticulum, 295.
Forehead of a bull, the, should be short and broad, 145.
Forehead of the Devon, description of, 18.
Foul in the foot, description of, 433.
Foul in the foot, most prevalent in low, marshy countries, 434.
Foul in the foot, mode of treatment of, 434.
Foul in the foot, probable advantages of neurotomy in, 437.
Fowler, Mr., an improver of the long-horns, 86.
Fowler, Mr., account of the sale of his stock, 87.
Free-martins, usually barren, 392.
Free-martins, dissection of three, 393.
Free-martins, a few cases in which they have bred, 393.
Frontal sinuses, description of, 143, 144.
Frontal sinuses, use of the, 145, 146.
Frontal sinuses, inflammation of the, nature and treatment of, 146.
Frontal sinuses, worms in the, 147.

Gall-bladder, the structure and use of, 320.
Gall-stones, their composition, 324.
Gall-stones, frequent cause of jaundice, 325.
Galloway, the greater part of the cattle were horned at the middle of the last century, 63.
Galloway, the present breed of, 63, 64.
Galloways, Mr. Culley's description of, 66.
Galloway cows not good milkers, 67.
Galloway bull, a perfect one seldom found, 68.

Galloways cows occasionally have horns, 151.
Gangrenous inflammation of the lungs, symptoms and treatment of, 268.
Garget, the cause of, 408, 409, 410.
Garget, the efficacy of iodine in, 409, 410.
Garget, the state of the veins of the udder in, 236.
Gas, the kind of, extricated in hoove, 307.
Gentian, the best tonic, 453.
Ginger, the best aromatic, 453.
Girth, the, of cattle, should be both deep and wide, 16.
Glamorganshire cattle, early history of, 37.
Glamorganshire cattle, deteriorated when they were neglected for the growth of corn, 38.
Glanders in cattle, on, 183.
Glauber's salt, inferior to the Epsom, 453.
Gloss-anthrax, the symptoms and treatment of, 196.
Gutta serena, cause and treatment of, 162.
Gut-tie, the nature and treatment of, 351.

Hair, cattle should be covered with a thick pile of, 17.
Haunch, description of the, 143.
Haw, description of the, 158.
Haw, inflammation of the, 158.
Haw, method of extirpating the, 151.
Head, section of the, 144.
Heart, description of the, 220, 221.
Heart, theory of its action, 221.
Heart, the muscular columns and tendinous cords of it stronger in the ox than the horse, 221.
Heart, a muscle running across the right ventricle, peculiar to the ox, 222.
Heart, description of the bone of it, 222.
Hebrides, history and description of the, 41.
Hebrides history, disgraceful management of cattle formerly, 43.
Hebrides, accounts of the misery of the cattle in the winter, 43.
Hebrides, present management, 44.
Hebrides, no crosses with any other breed have succeeded in these islands, 45.
Hebrides, 20,000 cattle annually exported from them, 46.
Hebrides, the outer, description of the cattle of, 46.
Hellebore, black, makes the best seton, 453.
Hemlock, the treatment of poisoning by, 110.
Hemorrhage from the nose, on, 181.
Hemorrhage after parturition, the treatment of, 401.
Herd-book, the short-horned, compiled by Mr. G. Coates, 102.
Hereford cattle, description of the, 29.
Hereford cattle, comparison between them and the Devons, 29.
Hereford cattle, their propensity to fatten, 29.
Hereford cattle, comparison between the old and new breeds, 29.
Hereford cattle, have been crossed with advantage by the Devons, 30.
Hereford cow, inferior in shape to the ox, 31.
Hereford cow, not good for dairy, 30, 32.
Hernia, the nature and treatment of, 361.
Hernia in calves, management of, 363.
Hide of cattle, should be thin, mellow, and not too loose, 17.
Hide-bound, the treatment of, 438.
Hips, the, of cattle should be large and round, 17.
Hock, description of the, 143.
Holderness cattle, the old, 135.
Holderness cattle, their improvement, 136.
Honeycomb.—See Reticulum.
Hooped form of the barrel, in cattle, importance of, 16.
Horns, description of the, 143.
Horns are elongations of, and hollowed like, the frontal bones, 148.
Horns, the different breeds of cattle distinguished by, 13, 151.
Horns, the influence of sex on the, 151.
Horns, as connected with the age of the beast, 150.
Horns, the danger of cutting them, 147.
Horns, fracture of them, how treated, 149.
Horns, the degree of fever, how estimated by means of them, 150.
Horns, tenderness of the roots accounted for, 151.
Horned and hornless breeds, comparison between them, 152.
Horny covering, composition and growth of the, 150.
Hoose.—See Catarrh.
Hoose, in calves, the treatment of, 425.
Hoove, the cause of, 303.
Hoove, symptoms and treatment of, 303.
Hoove, medicines administered in, do not enter the stomach, 304.
Hoove, objections to puncturing the rumen in, 305.
Hoove, danger of a large incision, 306.
Hoove, when the rumen is punctured, it should be with a trocar and canula, 306.
Hoove, the use of the probang, or stomach-pump, recommended, 306.
Hoove, the nature of the gas which is extricated in, 307.
Hoove, the treatment of, when the gas has escaped, 308.
Howick red ox, an account of, 104.
Hubback, the father of the improved short-horns, account of him, 97.
Hydatids in the brain, symptoms and treatment of, 162.
Hydatids, numerous, found in the liver of a cow, 322.
Hydrocephalus, treatment of, 163.

Ileum, description of the, 330, 331.
In-and-in, the principle of breeding adopted by Bakewell, 85.
Inflammation, the nature and general treatment of, 223.
Inflammatory fever, causes, symptoms, and prevention of, 225.
Inflammatory fever, treatment of, 229.
Intestines, description of the, 329.
Intestines, the diseases of the, 333.
Intestines, inflammation of the external coat of the.—See Enteritis.
Intestines, inflammation of the mucous coat of.—See Diarrhœa and Dysentery.
Inversion of the rectum, 354.
Inversion of the womb, 395.
Iodine, the admirable use of, 454.
Ireland, the establishment of the short-horns in, 80.
Irish cattle, the middle-horns an aboriginal breed, 77
Irish cattle, long-horns, probably derived from Lancashire, 78.
Irish cattle, long-horns, two different kinds of, 80.

Jaundice, causes of, symptoms and treatment, 323.
Jejunum, description of the, 330, 331.
Jenner, Dr., his discovery of the preventive power of the cow-pox, 420.
Joint murrian, its treatment, 226.
Joints opened, the treatment of, 431.
Joints, swellings of them, the causes and treatment of, 429.
Jugular vein, description of the, 204.

Kerry, the cow of, description of, 78.
Kidneys, anatomical structure of the, 366.
Kidneys, inflammation of the, causes, symptoms, and treatment of, 374.
Kidneys, calculi in, symptoms and treatment of, 377.
Kintore ox, 53.
Knee, description of the, 143.
Kyloe, origin of the term, 42.

Laryngites, the treatment of, 259.
Lead, the usual preparations of, 455.
Legs, the, of cattle should be short, 17.
Leicester new breed, inquiry into the value of, 88.
Leicester new breed, improved the whole breed of long-horns, 89.
Leicester new breed, superseded by the short-horns, 92.
Lice, how produced, and the method of destroying them, 442.
Lime, the chloride of, an excellent disinfectant, 231.
Lincolnshire cattle, description of, 136.
Linseed, experiments on its fattening properties, 71.
Linseed meal, excellent for poultices, 455.
Linseed oil, a good purgative, 456.
Lips, description and use of, 185.
Lip, upper, the use of the numerous glands in, 186.
Liquids, the circumstances under which they enter the rumen, 297.
Liver, the structure and functions of, 320.
Liver, on inflammation of the, 321.
Liver, the difficulty of detecting chronic inflammation of, 322.
Liver, on hemorrhage from it, 322.
Long-horns, the, appear to have originated in Craven, 81.
Long-horns, two distinct breeds of, the smaller and the larger, 81.
Long-horns, the history of the improvement of, 83.
Loss of cud, nature and treatment of, 309.
Loss of cud, more a symptom of disease than a separate disease, 309.
Lungs, the, their structure, 245, 264.
Lungs, inflammation of, symptoms and treatment of, 264
Lungs, inflammation of, acute and epidemic, its occasional devastations, 267.

Madness, causes and treatment of, 177.
Mange, the nature and treatment of, 439.
Manyplus, internal construction of the, 288, 289, 292.
Manyplus, the manner in which it reduces the food to a pulpy mass. 298.
Manyplus, the diseases of, 313.
Manyplus, the occasional strangely hardened state of its contents, 314.
Meath, the improvement of Irish cattle commenced in, 79.
Mercury, the different preparations of it used, 456.
Mesenteric glands, their structure and use, 333.
Mesenteric glands, enlargement of them, 333.
Mesentery, description of the, 330, 331.
Middle-horns, the, were probably the original cattle, 13.
Milk, the average quantity of, yielded by the Yorkshire cow, 133.
Milk fever, its nature and treatment, 401.
Milk fever, the importance of purging in, 403, 405.
Milk vein, description of the, 210, 219.
Milk vein, importance of a large one, 132.
Moor-ill, the nature and treatment of, 336.
Motor organic nerves, account of the, 205.
Mouth, account of the bones of the, 184.
Mouth, epidemic sore, 256.
Murrain, the nature, symptoms, and treatment of, 252.

Nagore cattle, an account of, 141.
Navel-ill, the nature and treatment of, 422.
Neck of cattle, description of, 201, 208, 211, 212, 214, 215.
Nerves of the leg, cuts of, 176.
Net or knot, the nature and treatment of, 350.

Neurotomy might be practised on cattle, 174.
Neurotomy, the probable advantage of it in foul in the foot, 437.
Neurotomy, description of the operation, 175.
Neurotomy, cuts illustrative of, 176.
Nitre, its value in cattle practice, 457.
Nitrous ether, spirit of it, when useful, 457.
Norfolk, the native cattle of, 74.
Norfolk polled cattle, their origin, 74.
Nose, bleeding from the, 181.
Nose, leeches in the, 182.
Nose, polypus in the, 182.
Nose, its membrane, inflammation of, 182.

O'Callaghan, Col., 131.
Œsophagean canal, cuts of it, 286, 288.
Œsophagus, the structure of, 278, 291.
Œsophagus, obstruction in the, treatment of, 279.
Œsophagus, the manner of opening in choking, 281.
Œsophagus, rupture of the, 285
Œsophagus, stricture of the, 284.
Œstrus bovis, the history of its several states, 443.
Opened joints, the treatment of, 431.
Ophthalmia, its nature and treatment, 159.
Opium, the best anodyne, antispasmodic and astringent, 457.
Ox, zoological description of, 9.
Ox, British, early history of, 11.

Pad on the upper jaw, description and use of the, 186.
Palsy, causes and treatment of, 172.
Pancreas, the structure, functions, and diseases of, 328.
Pantas, the nature and treatment of, 336.
Papillæ of the rumen, description of them, and of their uses, 295.
Paps in the mouth, treatment of, 206.
Parotid glands, inflammation of the, symptoms and treatment of, 205.
Parturition.—See Calving.
Paunch.—See Rumen.
Pembrokeshire cattle, description of, 37.
Pericardium, inflammation of the, 220.
Pericardium, the, often penetrated by sharp substances that have been taken into the rumen, 220.
Pharyngites, the symptoms and treatment of, 258.
Pharynx, description of the, 207.
Pharynx, inflammation of the, 258.
Pharynx, the mode of puncturing it in abscess situated there, 260.
Phrenzy, symptoms and treatment of, 164.
Phthisis.—See Consumption.
Placenta, the retention of it, in abortion, 386.
Placenta, the, should be discharged soon after calving, 400.
Placenta, method of separating it from the womb, 400.
Pleurisy, its symptoms and treatment, 271.
Pleuro-pneumonia, 267, 270.
Pneumonia, the symptoms and treatment of, 264.
Pneumonia, acute and epidemic, 267.
Points of cattle, a description of the principal, 16.
Poisons, a list of the various, and the mode of treating them, 310.
Polled cattle, an account of the, 63.
Polled and horned cattle, a comparison between them, 152.
Polypus in the nose, on, 182.
Poultices, when useful, 458.
Probang, the use of, in hoove, recommended, 306.
Pregnancy, the usual period of, 382.
Pregnancy, symptoms of, 387.
Presentation, natural, the management of, 389
Presentation, unnatural, do., 391.
Puncturing the rumen in hoove, objections to, 305.
Puerperal Fever.—See Milk Fever.
Pulse, cause of the, 223.
Pulse, importance of attention to the, 223.
Purging cattle, the occasional difficulty of, accounted for, 296, 357.
Purging cattle, the method of proceeding when this occurs, 296, 357.

Quarters, importance of their being long and full, 20.
Quarter-evil, its nature and treatment, 225.

Rabies, the causes and symptoms of, 177.
Rectum, description of the, 330, 332.
Rectum, the treatment of inversion of, 354.
Red-water, the nature and causes of, 367.
Red-water has more to do with the digestive organs and the food than any other cause, 368.
Red-water is most frequent in low marshy woody countries, 368.
Red-water, acute, the nature and treatment of, 368.
Red-water, the importance of bleeding and purging in, 369.
Red-water, chronic, the nature and treatment of 370.
Reticulum, the interior construction of it. 287, 289, 292.
Reticulum, the action of it in the return of the food to the stomach, 287, 275.
Reticulum, the diseases of the, 312
Rheumatism, the cause and treatment of, 428.
Ribs, the number and proper form of, 236.
Ribbed home, the importance of being, 76.
Rings, the, on the horn, as indicating the age, 150.

Rings, the, on the horn, as indicating the age, uncertainty of, 150.
Rottenness.—See Dysentery.
Rumen, the, viewed externally, 285, 286.
Rumen, the, viewed internally, 288, 290.
Rumen, general description of it, 288, 291.
Rumen, description of its papillæ, and their uses, 291.
Rumen, the fluid swallowed sometimes enters it, 296, 357.
Rumen, this accounts for the occasional difficulty of purging cattle, 296, 357.
Rumen, an account of the diseases of it, 299.
Rumen, the strange substances often found in it, 299.
Rumen, calculi in the, symptoms of, 299.
Rumen, calculi in, the effect of, 300.
Rumen, distensions of it by food, the symptoms and treatment of, 301.
Rumen, distension of it by gas, 303.
Rumen, inflammation of the, 310.
Rumination, description of it, 298.
Rupture of the parietes of the abdomen.—See Hernia.
Rupture of the bladder, symptoms of, 380,
Rupture of the œsophagus, treatment of, 285.
Rupture of the womb, treatment of, 379.
Rye, ergot of, its use in parturition, 458.

Salivary glands, description of the, 201.
Salt, its use in food as a medicine, 458.
Sapped.—See Constipation.
Saphena vein, the, when it should be opened, 218
Septum, the nasal, why not perfect in the ox, 180.
Setons, their occasional use, 458.
Shetland Islands, general description of them, 51.
Shetland Islands, description of the cattle there, 51.
Shetland Islands, treatment of the cattle, 52.
Shoot of blood, its nature and treatment, 225.
Shooting.—See Dysentery.
Short-horns, the, history of, 95.
Short-horns, supposed to be originally imported from the Continent, 96.
Short-horns, description of the old ones, 95.
Short-horns, the commencement of their improvement, 96.
Short-horns, the mode in which their improvement was effected, 96.
Short-horns, their excellence consists in a combination of qualities before believed to be incompatible, 95.
Short-horns, the question of their capacity for work, 108.
Short-horns, their early maturity should preclude their being put to work, 108.
Short-horned bulls, the advantage of crossing different breeds with them, 108.
Short-horns, the prevailing colors of, 109.
Short-horned cow, her milking qualities, 133.
Short-sighted, many cattle appear to be, 159.
Shoulders, a slanting direction of them, the importance of, 19.
Shropshire cattle, the old, 94.
Shropshire cattle, the cross between them and the Holderness, 94.
Silver, nitrate of, its use as a caustic, 459.
Skeleton of the ox, cut of the, 143.
Skin, the cause and importance of its soft mellow feeling, 438.
Skin, diseases of the, 438.
Skull, cavity of the, cut of, 144.
Skull, fracture of the, treatment of, 162.
Skull, fracture of, almost invariably fatal, 162.
Slinking.—See Abortion.
Smelling, on the sense of, 180.
Soft palate, description of the, 337.
Sore teats, treatment of, 408.
Sore throat, the symptoms and treatment of, 258.
Spinal cord, the comparative smallness of, accounted for, 154.
Spine, 241.
Spleen, structure and function of the, 319.
Spleen, hæmorrhage from the, 319.
Sprain in the leg and foot, symptoms and treatment of, 432.
Stephenson, Mr., 114.
Sternum, description of the, 237.
Sternum, the width of the, sometimes compensates for flatness of the sides, 241.
Stimulants, the propriety of administering, when it is difficult to purge cattle, 297.
Stomachs of cattle, cuts of them, 285, 286, 288, 291.
Stomach pump, the use of it in hoove recommended, 306.
Stone in the bladder, symptoms and treatment of, 378.
Stone in the kidneys, ditto and ditto, 377.
Stone in the ureters, ditto and ditto, 377.
Stone in the urethra, ditto, 379.
Strangulation of the intestines, symptoms and treatment of, 350.
Strangullion, description of it, 205.
Stricture of the œsophagus, treatment of, 284.
Subcutaneous abdominal vein, the question when it should be bled from, 219.
Subcutaneous abdominal vein, the anatomy of it, 219.
Sublingual glands, description of the, 207.
Submaxillary vein, description of the, 204.
Submaxillary artery, ditto, 205.
Suffolk cattle, were originally duns, 75.
Suffolk cattle, description of the, 75.
Suffolk cattle, milking properties of, 75.
Suffolk cattle, the bull cast off far too early, 75.

Sulphur, an excellent purgative and alterative, 459.
Sussex oxen, description of the, 33.
Sussex oxen, resemblance and difference between them and the Devons, 33, 34.
Sussex oxen, ditto, Herefords, 33, 34.
Sussex cow, description of her, 34.
Sussex cow, not good for the dairy, 35.
Sweetbread, description of the, 244.
Swelling of the joints, the causes and treatment of, 429.

Tail, description of the bones of the, 143.
Tail, should be level with the bones of the back, 20.
Tankerville, Lord, account of the wild cattle in his park, 12.
Tape-worm, an account of the, 358.
Tapping in dropsy, a description of the operation, 360.
Tar, its use in cattle practice, 459.
Taunton, the vale of, description of the cattle in, 26.
Tavistock, the South Devons purest about, 24.
Teeth, the form and structure of them, in ruminants, 187.
Teeth, regarded as indicating the age, 188.
Teeth, cuts of them, at different ages, 188, 189, &c.
Teeth, curious process of diminution of, commencing at three months, 190.
Teeth, when the mouth can be said to be full of, 192.
Teeth, the grinders, the age imperfectly estimated by, 194.
Tempest, Sir H. Vane, first introduced the short-horns into Ireland, 80.
Temporal artery, description of the, 205.
Temporal bone, description of the, 143, 153, 184.
Temporal vein, description of the, 204.
Tetanus, symptoms and treatment of, 167.
Thighs, they should be full, long, and close together when viewed from behind, 17.
Thigh-bone, description of the, 143.
Thrush in the mouth, symptoms and treatment of, 200.
Thymus gland, description of the, 244.
Tibia, or leg-bone, description of the, 143.
Tipperary, description of the cattle in, 78.
Tongue, description of it and its uses, 193.
Tonics, when admissible in the treatment of distemper, 347, 459.
Torsion, the method of castration by, 427.
Trachea, description of the, 243.
Tracheotomy, description of the operation of, 243.
Tracheotomy, cases in which it should be performed, 243.
Trotter, Col., 120.
Tumors, bony, about the eye, management of, 156.
Tumors, bony, about the eye, an advantageous way of firing, 156.
Turpentine, liquid, its uses as a digestive and a diuretic, 460.
Turpentine, oil of, its medicinal use, 460,
Turpentine, oil of, might possibly destroy the worms in the bronchial tubes, 249.
Typhus fever, nature of the, 233.
Typhus fever frequently follows inflammatory fever, 233.
Typhus fever, symptoms of, 233.
Typhus fever, treatment of, 234.
Typhus fever, the kind of cattle most subject to it, 234.
Typhus fever, prevention of, 235.
Twopenny, Mr. Bakewell's bull, account of, 86.

Udder, description of the, 132.
Ulcers, fetid, use of chloride of lime for, 231.
Upper jaw-bone, description of the, 143, 180, 184.
Ureters, description of the, 375.
Ureters, stone in the, symptoms and treatment of, 377.
Urethra, description of its curve, 376.
Urethra, stone in the, symptoms and treatment of, 379,
Urinary calculi, symptoms of their presence, 376.
Urinary calculi, composition of, 376.
Urus, account of the ancient, 10.

Veins, the largeness of, in the ox, compared with the arteries, 235.
Veins, description of the, 235.
Veins, varicose, the nature and treatment of, 236.
Verdigris, its use in cattle practice, 452.
Vertebræ of the spine, description of, 143.
Vinegar, of little use in cattle practice, 460.
Vitriol, white, the use of, 460.

Waistell, Mr., once owner of Hubback, 98.
Waistell, Mr., account of his fat four-year-old ox, 103.
Waistell, Mr. Wm., of Burdon, 119.
Waller, Mr., the first improver of Irish cattle, 80.
Warbles, how produced, 443.
Warbles, history of the fly and its several states, 443,
Warts, their nature and treatment, 445.
Water in the head, symptoms and treatment of, 163.
Webster, Mr., of Canley, an improver of the long-horns, 83.
Welby, a farrier, stands first among the improvers of the long-horns, 83.
West Highland cattle, the points in which they are valuable, 43.
West Highland cattle, the secret of profitably breeding and grazing them, 50.

Wild cattle, account of, 12.
Wind-pipe, description of the, 243.
Withers, hollowness behind them, disadvantage of, 19.
Womb, inversion of the, treatment of, 395.
Womb, rupture of the, ditto, 397.
Wood-evil, nature and treatment of, 336.
Worms in the frontal sinuses of cattle, 147.
Worms in the eye, treatment of, 162.
Worms, an account of the various intestinal ones, 357.
Wounds of the eye, management of, 156.

Yellows, the (see Jaundice,) 323.
Yew, the, treatment of poisoning by, 310.
Yorkshire cow, the history of the establishment of the present one, 131.
Yorkshire cow, description of her, 131.
Yorkshire cow, average quantity of milk yielded by her, 133.
Yorkshire cow, the question of the average quantity of butter, 133.
Yorkshire, North Riding, description of the cattle, 135.
Yorkshire, North Riding, the native cattle of were long-horns, 135.
Yorkshire, North Riding, account of the first Holderness established there, 135.
Yorkshire, North Riding, history of their improvement, 136.
Yorkshire, North Riding, general management of, 136.
Yorkshire, West Riding, 136.

Zinc, the preparations of it which are used medicinally, 460.
Zygomatic arch, the peculiar construction of it in the ox, 148.
Zygomaticus muscle, description of the, 208.

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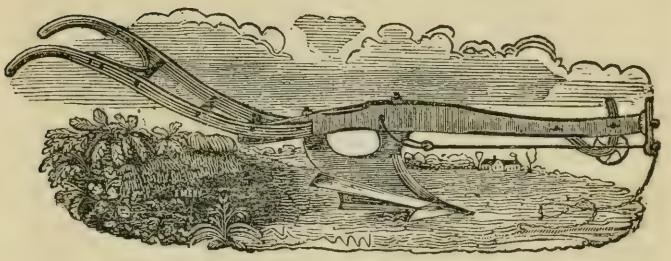

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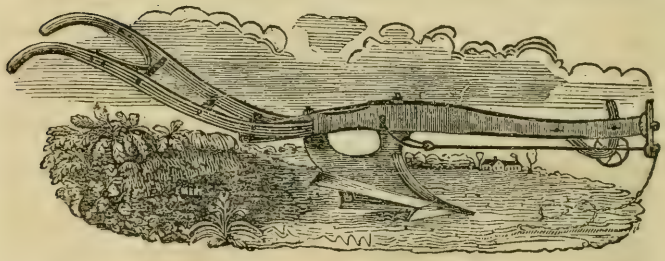

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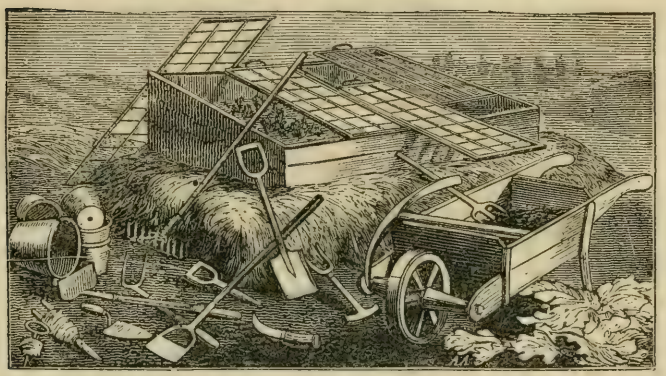

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